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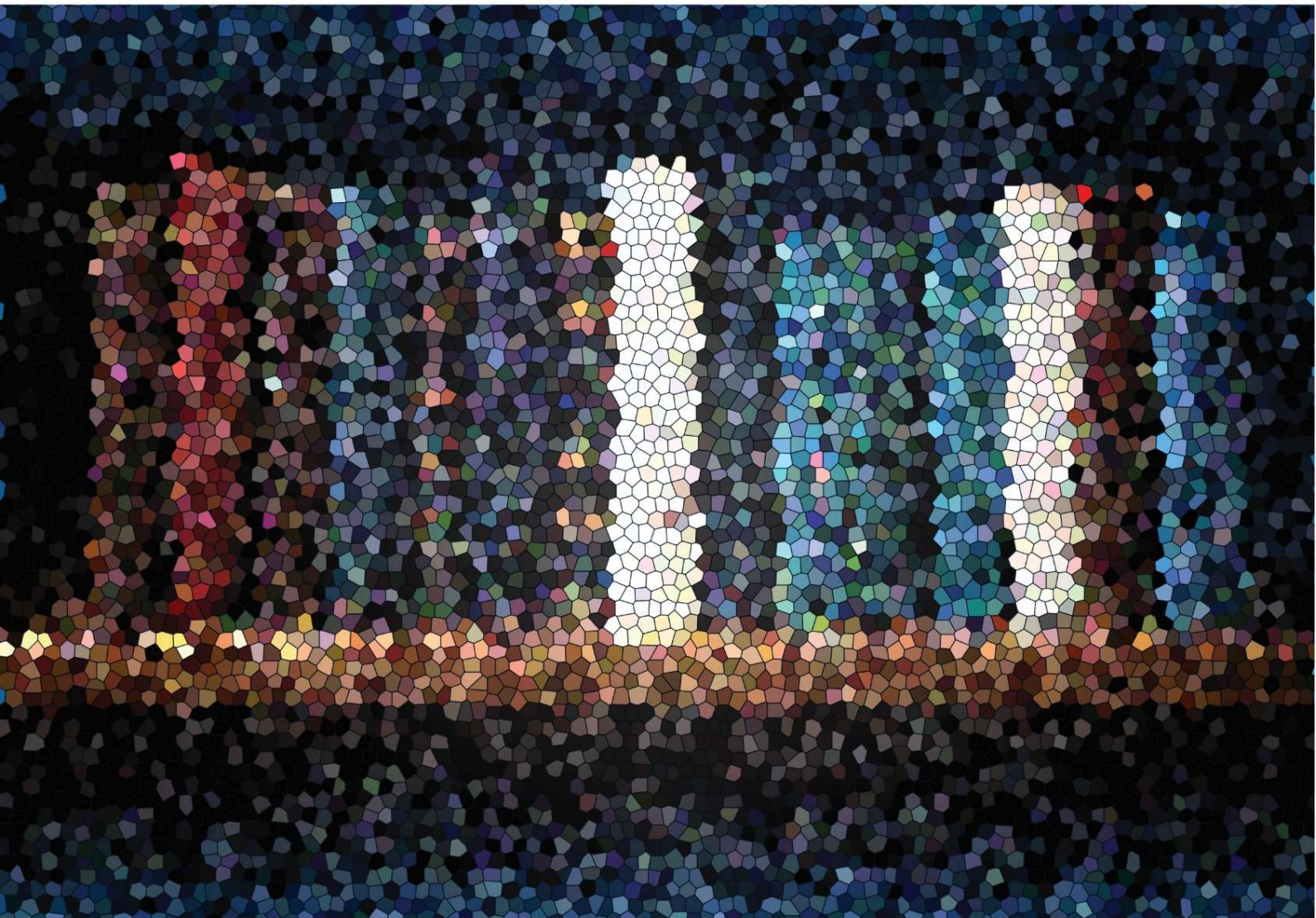
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Challenges and Solutions of Discipline in Contemporary Classroom Education

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Challenges and Solutions of Discipline in Contemporary Classroom Education

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Abstract	
Keywords: students; beginning teachers; discipline management; disciplinary issues; class of students.	The concept of classroom discipline refers to the various techniques utilized by educators to regulate the conduct and dispositions of pupils throughout the educational experience, with the aim of promoting compliance with institutional standards and fostering a secure, structured, and stimulating milieu conducive to learning. This article investigates the current methodologies and obstacles encountered by modern educational institutions in effectively addressing classroom behavior management. This article examines the perspectives of aspiring and novice educators on the significance of discipline within the classroom setting. It underscores the criticality of effective communication and collaboration among educational institutions, families, and communities in fostering a conducive and inspiring learning atmosphere. This article examines the perspectives of students in the field of education sciences and novice teachers on the origins of inappropriate student behavior and its impact on the educational process within the school setting. Additionally, the article suggests effective strategies and techniques for fostering responsible and appropriate behavior in the classroom. The article underscores the significance of both initial and continuous professional development in effectively managing student behavior, as well as preventing and addressing incidents of school violence.

Zusammenfasung	
Schlüsselworte: Schüler; angehende Lehrer; Disziplinmanagement; disziplinäre Probleme; Schülergruppe.	Das Konzept der Klassenführung bezieht sich auf die verschiedenen Techniken, die von Pädagogen angewendet werden, um das Verhalten und die Einstellungen von Schülern während ihrer Bildungserfahrung zu regulieren, mit dem Ziel, die Einhaltung der institutionellen Standards zu fördern und eine sichere, strukturierte und anregende Umgebung für das Lernen zu schaffen. Dieser Artikel untersucht die aktuellen Methoden und Hindernisse, mit denen moderne Bildungseinrichtungen konfrontiert sind, um das Management des Klassenverhaltens effektiv anzugehen. In diesem Artikel werden die Perspektiven angehender und unerfahrener Lehrkräfte zur Bedeutung von Disziplin im Klassenzimmer beleuchtet. Er unterstreicht die Bedeutung effektiver Kommunikation und Zusammenarbeit zwischen Bildungseinrichtungen, Familien und Gemeinschaften, um eine förderliche und inspirierende Lernumgebung zu schaffen. Dieser Artikel untersucht die Sichtweisen von Studierenden im Bereich der Bildungswissenschaften und angehenden Lehrern zu den Ursachen unangemessenen Schülerverhaltens und dessen Auswirkungen auf den Bildungsprozess in der schulischen Umgebung. Darüber hinaus schlägt der Artikel wirksame Strategien und Techniken zur Förderung verantwortungsbewussten und angemessenen Verhaltens im Klassenzimmer vor. Der Artikel unterstreicht die Bedeutung sowohl der anfänglichen als auch der kontinuierlichen beruflichen Entwicklung für das effektive Management des Schülerverhaltens sowie für die Verhinderung und Bewältigung von Vorfällen von Schulgewalt.

1. Introduction

Contemporary educational institutions encounter formidable obstacles in adhering to regulatory frameworks and upholding an environment conducive to order and discipline within the confines of the classroom. Educators across various proficiency levels, alongside educational administrators responsible for overseeing academic institutions, often encounter challenges in upholding classroom discipline and cultivating an atmosphere that facilitates effective learning. (Evertson, & Weinstein, 2006)

Discipline, within the context of the scholastic milieu, assumes a pivotal role as an essential constituent of the pedagogical endeavor, thereby fostering the holistic growth of students and engendering profound ramifications for their scholastic and personal trajectories. The objective of fostering discipline within the student classroom is to establish an optimal educational setting that cultivates the values of rule adherence, respect for peers and objects, accountability, cooperation, and self-regulation. Simultaneously, it is imperative to acknowledge that discipline plays a pivotal role in the development of one's character and the cultivation of responsible and engaged individuals within the societal framework.

The issue of classroom discipline presents an enduring and ubiquitous challenge for both educators and learners. The establishment and sustenance of a positive and well-organized learning environment frequently presents a significant challenge to pedagogical aptitude. (Hochweber et al., 2014) The classroom environment is often confronted with challenges pertaining to discipline, which can be attributed to various factors such as students' diminished ability to concentrate, engagement in disruptive behaviors, or a complete disregard for established rules and norms.

The influence of discipline on the prevalence of stress within the educational setting is a subject of considerable importance. The establishment of a disciplined environment has been found to effectively mitigate confusion and chaos, thereby fostering a heightened sense of stability and control among individuals. Research suggests that an enhanced ability to concentrate and a heightened sense of confidence in managing academic demands can significantly benefit students. Furthermore, the implementation of effective classroom discipline strategies plays a pivotal role in promoting equitable learning opportunities for all students. In the absence of disruptive conduct, individuals have the potential to derive advantages from education within an environment characterized by fairness and equity.

Character building is a fundamental component of discipline within educational institutions. The acquisition of responsibility, adherence to rules, and self-regulation are key components of students' educational development. The aforementioned character traits exhibit substantial utility, not only in the present moment but also in the long-term trajectory of individuals' lives. Hence, it is evident that the field of study not only makes a valuable contribution to the advancement of scholarly knowledge, but also plays a pivotal role in cultivating individuals who possess a sense of responsibility and empathy, thereby equipping them with the necessary skills to thrive in the intricate and dynamic global landscape of the future.

2. Theoretical foundation

The semantic interpretation of the term "discipline" is contingent upon contextual factors, thereby encompassing a diverse array of connotations and facets. According to the Merriam-Webster dictionary, the word "discipline" is defined as a noun with multiple meanings and has its roots in the Latin word "disciplina". The dictionary provides a comprehensive analysis of the etymology and various interpretations of the term. The source, available at https://www.merriam-webster.com/dictionary/discipline, offers a reliable and authoritative reference for understanding the historical development and semantic nuances associated with this word. From an etymological perspective, it is noteworthy that the term "discipline" originates from Latin. In its original sense, it encompassed various meanings such as "punishment," "system of orderly conduct," "instruction," "branch of learning," "teaching," "training," "branch of study," and "orderly conduct based on moral training" (ibid). According to the explanatory dictionary of the Romanian language, the concept of "discipline" is defined as the comprehensive set of obligatory rules of conduct and order that are applicable to the individuals belonging to a particular collective (Dexonline, 2021). The concept of discipline encompasses a diverse array of themes ascribed to it in existing literature. These themes encompass mental development, adherence to predetermined norms, indoctrination, and the utilization of physical punishment as a pedagogical tool. The concept of "discipline" encompasses two distinct but interconnected dimensions within the educational setting: the proactive prevention of misconduct and the reactive implementation of corrective measures.

The effective management of disciplinary matters within a classroom setting plays a significant role in fostering an optimal learning environment. In this study, the authors, Afifah and Ifnuari (2022), aim to investigate and analyze a specific research topic. The purpose of this research is to contribute The establishment of clear rules and expectations in educational settings provides students with a comprehensive understanding of anticipated outcomes and appropriate conduct. The reduction of uncertainty and stress has been found to have a positive impact on individuals' ability to effectively engage in the learning process. By minimizing uncertainty and stress, individuals are able to allocate their cognitive resources more efficiently, leading to improved focus and attention. This enhanced cognitive state facilitates the acquisition and retention of new knowledge and skills. Consequently, reducing uncertainty and stress can be considered a crucial factor in optimizing the learning experience.

Sieberer-Nagler (2015) posits that discipline is a pedagogical strategy employed by educators to uphold and reinforce established classroom regulations, with the ultimate aim of modifying the conduct of students

who exhibit disruptive behavior. According to Sieberer-Nagler (2015), discipline can be defined as the deliberate actions undertaken by educators to uphold regulations and address instances of student misconduct.

The influence of classroom climate on students' attitudes and motivation towards school and learning has been widely acknowledged in academic literature. Numerous studies have demonstrated the significant role that the classroom environment plays in shaping students' perceptions and experiences within educational settings (Lopes & Oliveira, 2017; Doyle, 2006; Osher et al., 2010). This research underscores the importance of creating a positive and supportive classroom climate to foster students' engagement, enthusiasm, and commitment to their academic pursuits. By cultivating an environment that promotes inclusivity, respect, and collaboration, educators can enhance students' overall attitudes towards school and learning, ultimately leading to improved educational outcomes (Mitchell, & Bradshaw, 2013). The establishment and sustenance of a positive and supportive classroom environment are crucial factors in fostering a sense of security, encouragement, and confidence among children. These elements serve as catalysts for their motivation to attend school regularly and engage actively in the educational process. According to Wiseman and Hunt (2008), the establishment of a positive classroom climate emerges as a significant determinant for children's inclination towards attending school. Furthermore, the authors assert that this favorable environment fosters an intrinsic motivation for learning among children.

The issue of classroom discipline is a significant and prevalent challenge encountered by educators in their professional practice (Simón & Alonso-Tapia, 2016). The effective management of student misbehavior is widely recognized as a crucial skill for educators in facilitating optimal conditions for the instructional and educational process (Tsouloupas, 2011; Baker, 2005).

According to Grayson and Alvarez (2008), educators expend a considerable amount of energy in maintaining discipline within the classroom setting while engaged in instructional activities. The allocation of substantial resources, both in terms of effort and time, towards the establishment and maintenance of discipline within the classroom environment can yield noteworthy consequences for educators and the educational outcomes of students. Multiple research studies have demonstrated that a substantial number of educators hold the perception that the management of discipline within the classroom setting demands a significant allocation of both time and resources. According to Tsouloupas et al. (2010), a prevailing belief among educators is that the establishment and preservation of discipline within the classroom setting is a significant contributor to the perceived inefficiency of instructional time. The experience described can potentially result in the manifestation of frustration and emotional exhaustion, thereby exerting a detrimental influence on the overall personal and professional well-being of individuals. This phenomenon has been identified as a prominent contributing factor to the occurrence of emotional exhaustion within the teaching profession (Carson et al., 2011; Oliver & Reschly, 2007).

The present study examines the correlation between school discipline in the classroom and teacher turnover, as discussed in the existing body of specialized literature. Tsouloupas et al. (2010) posit that teacher turnover is particularly prevalent in instances where educators encounter elevated levels of disciplinary issues and lack sufficient administrative support (Kersaintet et al., 2007; Ingersoll & Smith, 2003).

The management of student misbehavior poses a considerable challenge for educators, as it has been recognized as the primary source of distress among teachers (Evers et al., 2002; Cothran et al., 2009). The potential consequences of this phenomenon extend to various aspects of the educational setting, including the learning environment within the classroom, the allocation of teachers' time and energy, as well as their emotional well-being. The presence of problem behaviors within a classroom setting has the potential to significantly impact the learning outcomes of both the individuals engaging in such behaviors and their peers. The training of teachers is of utmost importance in order to effectively address these situations and establish a learning environment that is both safe and conducive to positive outcomes.

3. Research methodology

3.1. General objective

The primary aim of this study is to examine the perspectives of students in the area of educational sciences and novice teachers on the various ways and difficulties faced by modern schools in effectively addressing disciplinary issues within the student body.

3.2. Specific objectives

SO1: Investigating the perception of aspiring and novice teachers on the significance of their subject area in the classroom.

SO2: The significance of communication and cooperation between the school, home, and community in fostering a disciplined and stimulating school environment.

SO3: Examine the perspectives of students in the area of education sciences and rookie instructors on the factors contributing to students' improper conduct and the resulting impact on the learning process within the school setting.

SO4: Identifying successful tactics and procedures for promoting proper and responsible conduct in the classroom, specifically focusing on preventative and intervention approaches.

SO5: Examine the perspectives of students in the area of educational sciences and novice teachers on the significance of initial and ongoing professional training in effectively addressing student conduct, as well as preventing and addressing instances of violence within educational settings.

3.3. Sample

A total of 384 individuals were included in the research study. The demographic composition of the target group, as shown by gender/sex (Table 1), profession (Table 2), environment of origin (Table 3), and age (Table 4) of the participants, exhibits the following attributes:

Table 1. Structure of the target group according to the gender of the respondents

Gender/sex	Number of responses	%
Male	32	8.33%
Female	352	91.67%
TOTAL	384	100.00%

Table 2. Structure of the target group according to the respondents' occupation

Occupation	Number of people	%
Pedagogy student of primary and preschool education	200	52.08%
Master's student in Educational Management	16	4.17%
Student at the Teaching Staff Training Department	64	16.67%
Student and beginning teacher	56	14.58%
Beginning teaching staff	48	12.50%
TOTAL	384	100.00%

Table 3. Structure of the target group according to the respondents' background

The environment of origin	Number of responses	%
Urban	256	66.67%
Rural	128	33.33%
TOTAL	384	100.00%

Table 4. Structure of the target group according to the age of the respondents

Age	Number of responses	%
under 20 years	0	0.00%
21-30 years old	176	45.83%
31-40 years old	120	31.25%
41-50 years	72	18.75%
50-60 years	16	4.17%
over 60 years	0	0.00%

3.4. Methodology

In this research, a sociological survey based on a questionnaire was used. The questionnaire included 19 items structured according to the specific objectives of the research.

4. Results

The research findings are organized and presented based on the questionnaire questions and the particular goals of the study.

SO1: Investigating the perception of aspiring and novice teachers on the significance of their subject area in the classroom.

Based on the feedback provided by the participants, the primary obstacles faced by the educational institution in effectively managing student discipline within the modern setting encompass issues such as school violence (including bullying and conflicts), students' inappropriate conduct during school hours, inadequate parental support and engagement, individual variations and the unique requirements of students, as well as diminished student motivation and engagement levels. In light of a growing array of issues, the educational institution must identify and implement suitable solutions. The persistent difficulty faced by educators is the escalation of violent conduct and violence inside educational settings. Verbal and physical violence, together with online bullying, are significant concerns that have the potential to detrimentally impact the school atmosphere and the overall well-being of

children. The data pertaining to the primary obstacles encountered by the school in effectively regulating classroom discipline is shown in Table 5.

Table 5. The main challenges of the school regarding the management of discipline in the class of students in the contemporary context

Answer options	Number of responses	%
a) Inadequate behavior of students in the school environment	328	85.42%
b) Bullying and conflict between students	352	91.67%
c) Low motivation and commitment of students	216	56.25%
d) Individual differences and special needs of students	232	60.42%
e) Discipline problems in the classroom	80	20.83%
f) Lack of parental support and involvement	304	79.17%
g) Limited access to educational resources and appropriate teaching materials	136	35.42%
h) The negative impact of students' social and cultural environment on classroom behavior	224	58.33%
j) Academic pressure and student stress as factors affecting classroom behavior	80	20.83%

The study findings indicate that a significant proportion of participants (360 individuals, accounting for 93.75% of the sample) hold the belief that maintaining discipline in the classroom is crucial for establishing an atmosphere that facilitates successful learning.

The maintenance of discipline within the classroom setting has a substantial influence on both the instructional-educational process and the personal and social growth of pupils. A structured and disciplined classroom setting fosters an optimal atmosphere for the facilitation of instruction and acquisition of knowledge, so enhancing students' academic performance, nurturing their social competencies, and equipping them with the necessary abilities for future accomplishments in their professional life. The collected responses (Table 6) pertain to the impact of punishment in the classroom on the instructional-educational process, as well as the personal and social development of students.

The primary objective of classroom discipline is to provide an ideal setting for educational and individual growth, whereby children are able to experience a sense of security, get due respect, and remain motivated to achieve their maximum capabilities. The

educational setting fosters the development of pupils in anticipation of their future endeavors and cultivates conscientious and proficient individuals for the betterment of society. Based on the survey participants' responses, the primary objective of classroom discipline encompasses the promotion of mutual respect and proper conduct (87.5%), the establishment of a safe and organized learning environment (81.25%), and the cultivation of self-control abilities and student responsibility (75%). The data obtained for this item is shown in Table 7.

Table 6. How discipline in the class of students can influence the instructional-educational process, as well as the personal and social development of students

Answer options	Number of responses	%
a) Provides a stable and structured framework to maximize student attention and participation in lessons	344	89.58%
b) It helps to maintain a high level of concentration and commitment in learning	240	62.50%
c) It allows teachers to manage the instructional-educational process as well as possible, facilitating the students' learning process	328	85.42%
d) It contributes to increasing the efficiency and quality of students' learning	224	58.33%
e) Classroom discipline contributes to the development of self-control skills and respect for others	280	72.92%
f) Classroom discipline can positively affect interpersonal relationships and collaboration between students	176	45.83%
g) I do not consider that the discipline in the students' class has a significant impact on the personal and social development of the students	24	6.25%

Table 7. The main purpose of the discipline in the class of students

Answer options	Number of responses	%
a) Ensuring a safe and orderly environment for learning	312	81.25%
b) Promoting mutual respect and appropriate behavior	336	87.50%
c) Developing self-control and responsibility skills among students	288	75.00%
d) Improving the learning process and students' concentration	264	68.75%
e) Increasing commitment and motivation for learning	152	39.58%
f) Improving interpersonal relationships and collaboration between students	216	56.25%

The use of effective classroom disciplinary strategies is of paramount importance in fostering the growth and cultivation of students' social and behavioral competencies. This entails acquiring knowledge and adhering to established guidelines, fostering efficient interpersonal exchange, and cultivating abilities to address and resolve conflicts. Moreover, discipline has a crucial role in fostering collaboration, promoting the cultivation of empathy and respect, and facilitating the practice of self-control and personal accountability. Students acquire the ability to demonstrate reverence for the regulations and jurisdiction of educators, as well as to exhibit courteous conduct towards their peers. The acquisition of these abilities is crucial for the personal and social growth of students, equipping them with the necessary tools to assume accountability and engagement as productive members of society. The respondents included in the study offered the following responses, as displayed in Table 8, in relation to the question "In what ways can classroom discipline contribute to the enhancement of students' social and behavioral skills?"

Table 8. How classroom discipline can contribute to the development of students' social and behavioral skills

Answer options	Number of responses	%
a) By promoting respect and tolerance between students	344	89.58%
b) By learning the appropriate social rules and norms	280	72.92%
c) By developing communication and collaboration skills in group activities	280	72.92%
d) By cultivating responsibility and self-discipline in managing one's own behavior	288	75.00%

SO2: The significance of communication and cooperation between the school, home, and community in fostering a disciplined and stimulating school environment.

The establishment of effective communication and cooperation among educational institutions, families, and communities is crucial for fostering a structured and inspiring school atmosphere. The cultivation of classroom discipline, in conjunction with the establishment of open lines of communication, collaborative efforts, and mutual support among educational institutions, families, and communities, plays a pivotal role in fostering the comprehensive growth of students and equipping them with the

necessary skills and competencies for their future endeavors.

In your perspective, how significant is the role of communication and cooperation among the school, family, and community in fostering a disciplined and inspiring school environment? A total of 368 individuals, accounting for 95.83% of the sample, selected the option labeled as "Very important." According to the viewpoint of 87.5% (336 individuals), the establishment of a disciplined and motivating school environment is contingent upon the presence of effective communication and collaboration. Conversely, 12.5% (48 individuals) hold the belief that communication and collaboration may play a partial role in fostering such an environment.

In relation to the topic of enhancing communication and cooperation between schools, families, and communities, the statistics shown in Table 9 have been collected.

Table 9. Types of activities or programs that could be developed to promote communication and collaboration between school, family and community.

Answer options	Number of responses	%
a) Organizing regular meetings between teachers, parents and community members to exchange information and ideas	272	70.83%
b) Creation of volunteering programs and partnerships with local organizations in order to involve the community in school activities	272	70.83%
c) Using modern means of communication (e.g. online platforms, newsletters) to maintain a constant connection with parents and the community	224	58.33%
d) Organizing events and activities that bring school, family and community together to promote collaboration and positive relationships	304	79.17%

SO3: Examine the perspectives of students in the area of education sciences and rookie instructors on the factors contributing to students' improper conduct and the resulting impact on the learning process within the school setting.

The occurrence of student misconduct within the educational setting may stem from several sources and have notable impacts on both the learning process and the overall atmosphere of the school. The opinions of the participants regarding the primary factors contributing to inappropriate student behavior in the

classroom, as presented in Table 10, elucidate these behaviors as being influenced by negative societal factors (83.33%), unmet student needs such as emotional and social needs (81.25%), and the quality of education received within the family environment (81.25%). Considering the demographic of the participants, who are affiliated with the educational setting as either current or aspiring teaching professionals, it is evident that a much less proportion attribute the origins of students' improper conduct to factors inside the school context.

Table 10. The main causes of inappropriate behavior of students in the classroom

Answer options	Number of responses	%
a) The education received in the family environment	312	81.25%
b) Academic pressure and stress	72	18.75%
c) Unsatisfied needs of students (e.g. emotional, social needs)	312	81.25%
d) Negative influences from the social environment	320	83.33%
e) Inadequate attitude of some teachers	168	43.75%

In relation to the primary ramifications resulting from students' inappropriate conduct within the classroom and its impact on their academic achievement, the study participants have identified a range of consequences as outlined in Table 11. Noteworthy among these are the following: "distraction and diminished concentration among students" (79.17%), "adverse effects on the learning environment and student collaboration" (77.08%), "disruption of the lesson's rhythm and progression, thereby impeding comprehension and assimilation of the subject matter" (68.75%), and "elevation of stress and anxiety levels within the classroom" (66.67%).

Table 11. The main consequences of students' inappropriate behavior on the learning process in the classroom and their academic performance

Answer options	Number of responses	%
a) Distracting attention and decreasing students' concentration	304	79.17%
b) Increasing the level of stress and anxiety in the classroom	256	66.67%
c) Negative impact on the learning atmosphere and collaboration between students	296	77.08%
d) Decreased academic performance and reduced involvement in school activities	192	50.00%

e) Disturbance of the rhythm and flow of the lesson, affecting the understanding and assimilation of the content	264	68.75%
f) Disturbance of the balance and emotional stability of other students	176	45.83%
g) Slowing down the progress and learning process of the whole group/class	176	45.83%
h) Dispersing the teacher's energy and resources, reducing effective teaching time	128	33.33%
i) Developing a feeling of insecurity and dissatisfaction among students	96	25.00%
j) Reduced participation and active involvement in class activities and academic discussions	112	29.17%
k) Developing a negative learning environment, where students feel demotivated or discouraged	112	29.17%
l) Deterioration of the teacher-student relationship, generating tensions and communication difficulties	184	47.92%
n) Difficulties in implementing teaching and assessment strategies and methodologies	104	27.08%

SO4: Identifying successful tactics and procedures for promoting proper and responsible conduct in the classroom, specifically focusing on preventative and intervention approaches.

The cultivation and maintenance of suitable and accountable conduct within the educational setting necessitates the use of efficacious tactics and methodologies. The query "How can a balance be achieved between maintaining discipline in a classroom setting and fostering an inclusive and motivating learning atmosphere?" yields the responses outlined in Table 12. A significant proportion of participants (91.67%) hold the view that a harmonious equilibrium between classroom discipline and a stimulating learning environment can be attained through the integration of behavioral guidelines with diverse and engaging pedagogical approaches and activities. Additionally, fostering collaboration and constructive interaction between students and the instructor (81.25%) is seen as another effective strategy in achieving this balance.

According to the participants, the strategies and techniques deemed most effective for fostering appropriate and responsible behavior within the classroom (as indicated in Table 13) encompass the promotion of communication and collaboration among students during group activities, with a majority of

respondents (81.25%) endorsing this approach. Additionally, the development of a social-emotional curriculum aimed at cultivating behavior management skills was identified by a significant proportion of participants (64.58%) as another effective method.

Table 12. Strategies to strike a balance between classroom discipline and creating an open and motivating learning environment

Answer options	Number of responses	%
a) By combining behavioral rules with varied and interesting learning methods and activities	352	91.67%
b) By promoting collaboration and constructive interaction between students and the teacher	312	81.25%
c) By adapting strategies and approaches according to the individual needs of students	256	66.67%
d) By integrating innovative technologies and resources in the learning process	160	41.67%

Table 13. Effective strategies and techniques used to promote appropriate and responsible behavior in the classroom

Answer options	Number of responses	%
a) Implementing a system of rewards and recognition for positive behavior	192	50.00%
b) Consistent application of rules and disciplinary sanctions	176	45.83%
c) Promoting communication and collaboration between students in group activities	312	81.25%
d) Developing a socio-emotional curriculum to teach behavior management skills	248	64.58%

Effectively addressing challenging student behavior is a significant hurdle for educators and school personnel. The cultivation of a good learning environment, whereby pupils experience a sense of acceptance and are motivated to study and adhere to school regulations, necessitates the exercise of patience, professionalism, and dedication on the part of educators and school personnel. Table 14 presents the answers gathered for the inquiry on successful pedagogical tactics or approaches for regulating students' behavior in the classroom.

The educational process and the level of student engagement are influenced by the physical environment in which students conduct their activities. In response to the query regarding the utilization of the physical classroom environment to foster suitable and responsible conduct, the participants expressed their belief that this objective can be accomplished through several means. Firstly, they emphasized the importance of arranging the classroom space in a manner that facilitates student collaboration and interaction, with 83.33% of respondents supporting this approach. Additionally, 77.08% of participants highlighted the significance of establishing a safe and orderly environment that promotes discipline and mutual respect. Furthermore, 58.33% of respondents suggested the use of visual cues and symbols to serve as reminders of rules and to guide appropriate behavior. Lastly, 56.25% of participants advocated for the integration of design elements and decor within the classroom setting to enhance student motivation and engagement.

Table 14. Effective pedagogical techniques or approaches in managing student behavior

Answer options	Number of responses	%
a) Using different instructional methods and interactive activities to keep students engaged and engaged	328	85.42%
b) Implementing classroom management techniques to quickly signal and resolve inappropriate student behavior	240	62.50%
c) Using time management techniques to maintain a steady flow of activities and reduce the possibility of inappropriate behavior	240	62.50%
d) Promoting self-regulation and conflict resolution skills through training and practice	216	56.25%

The item "How can parents of students and the community be involved in promoting appropriate and responsible behavior in the classroom?" obtained the following answers, shown in Table 15.

Table 15. Strategies for involving students' parents and the community in promoting appropriate and responsible behavior in the classroom.

Answer options	Number of responses	%
a) Organizing sessions and meetings with parents to discuss student behavior and receive feedback and suggestions	296	77.08%
b) Creating a partnership with the local community to provide resources and support in promoting appropriate behavior	240	62.50%
c) Informing parents about the rules and behavior expectations in the classroom and asking for their support in applying them	280	72.92%

	256	66.67%
d) Organizing activities and events in which parents and the community can participate to support and promote appropriate behavior		

Teachers must use a well-rounded strategy rooted on comprehension and constructive punishment when addressing instances of student disobedience. When inquired about the manner in which educators should approach and address inappropriate student behavior, the individuals engaged in the study emphasized the significance of discerning the underlying factors contributing to such behavior (68.75%). Additionally, they highlighted the involvement of parents and the community as crucial in effectively managing student conduct (66.67%). The responses collected for this question have been compiled and are shown in Table 16.

Table 16. Ways in which teachers can respond to inappropriate student behavior

Answer options	Number of responses	%
a) By establishing clear rules and expectations and by consistently applying sanctions	232	60.42%
b) By approaching inappropriate behavior as an opportunity for learning and personal development	240	62.50%
c) By identifying the causes of inappropriate behavior	264	68.75%
d) By involving parents and the community in managing student behavior	256	66.67%

SO5: Examine the perspectives of students in the area of educational sciences and novice teachers on the significance of initial and ongoing professional training in effectively addressing student conduct, as well as preventing and addressing instances of violence within educational settings.

Regarding the item "What is the significance of initial professional training in managing student behavior and preventing school violence?" Out of the total number of respondents, 91.67% (352 individuals) selected the option labeled as "very important," whilst 8.31% (32 individuals) chose the option labeled as "important."

The primary advantages that educators or aspiring educators can derive from engaging in ongoing professional development programs focused on student behavior management and school violence prevention include the acquisition of new skills and competencies in behavior management (89.58%),

enhancement of relationships with students and parents (68.75%), and a boost in confidence regarding behavior management abilities (62.5%). The responses collected for this question are consolidated and presented in a centralized manner in Table 17.

Table 17. The main benefits that teachers or future teachers can obtain by participating in continuing professional education programs in managing student behavior and preventing school violence

Answer options	Number of responses	%
a) Developing new skills and competencies in behavior management	344	89.58%
b) Increasing confidence in behavior management skills	240	62.50%
c) Improving the relationship with students and parents	264	68.75%
d) Reducing incidents of violence and bullying in school	256	66.67%
e) Improving the learning environment and classroom atmosphere	184	47.92%
f) Increasing academic performance and student engagement in the learning process	184	47.92%
g) Improving conflict management skills and solving problems constructively	176	45.83%
h) Promoting a safe and secure school environment for all students	152	39.58%
i) Developing a preventive approach in identifying and intervening on inappropriate behavior	104	27.08%
j) Improving the ability to communicate and collaborate with colleagues and school teams	128	33.33%
k) Better understanding of individual student needs and differences	152	39.58%
l) Developing an approach based on respect and students' rights in the school environment	120	31.25%
m) Promoting a culture of responsibility and citizenship among students	72	18.75%

Item: What sorts of continuing professional education programs in the areas of student behavior management and school violence prevention are you interested in pursuing?

Table 18 displays the findings for this item.

Table 18. Types of in-service training programs in student behavior management and school violence prevention that respondents would be interested in

Answer options	Number of responses	%
a) Trainings and practical workshops in behavior management techniques	248	64.58%
b) Conflict resolution skills development programs	264	68.75%
c) Training programs to prevent and combat bullying and violence in school	256	66.67%
d) Effective communication trainings with students and parents	248	64.58%
e) Programs to develop students' socio-emotional skills	224	58.33%
f) Training in motivation techniques and active involvement of students in learning	104	27.08%
g) Trainings to manage the diversity and special needs of students	112	29.17%
h) Training programs in the implementation of positive pedagogy and positive discipline	144	37.50%
i) Personal development and self-knowledge trainings for teachers	104	27.08%
j) Training programs in the identification and early intervention in inappropriate student behavior	120	31.25%
k) Trainings in stress and anxiety management techniques in the classroom	104	27.08%
l) Programs to develop counseling skills and emotional support for students	128	33.33%
m) Ethics and professional responsibility courses in managing student behavior	104	27.08%

5. Discussions

Classroom discipline fosters a safe atmosphere in which students learn essential lessons about responsibility and the consequences of their behavior. These teachings are not only applicable in the classroom, but also in their everyday lives and professional destinies. Another important part of discipline is the development of self-control abilities. Students are taught to manage their urges and make sound judgments in a range of settings, so learning key abilities for dealing with future issues efficiently. The research data show that the main challenges of the school regarding the management of discipline in the classroom of students in the contemporary context are finding appropriate answers to problems related to bullying and conflicts that have arisen between students, as well as inappropriate behaviors of students at school, but also the low involvement of parents in maintaining and developing the relationship with the s. Due to the intricacy, subtlety, and variety of manifestations of these phenomena, combating bullying and violence in school may be a challenging challenge for teachers. Involving parents and the community alongside the school may be a realistic alternative, with the knowledge that achieving the intended outcomes requires tact and expertise on the part of the school. Some kids' aggressive and disruptive conduct costs instructional time, interrupts learning for all students, jeopardizes safety, and overwhelms instructors (Wiseman & Hunt, 2008).

Students are exposed to an ideal learning environment in a disciplined atmosphere, where they may process material more effectively and take full use of educational possibilities. Discipline helps children acquire self-control, responsibility, and respect for others, as well as promotes them to interact successfully with others and resolve disagreements constructively. Thus, classroom discipline can influence students' social and behavioral skills development by promoting respect and tolerance (89.58%), cultivating responsibility and self-discipline in managing one's own behavior (75%), learning appropriate social rules and norms (72.92%), and developing communication and collaboration skills in group activities (72.92%).

Preparation for success is one of the noteworthy outcomes of a well-maintained discipline. Students learn to meet deadlines, follow instructions, and work in groups. These abilities are in high demand and respected in the professional world, so a strong foundation of discipline may provide them with a competitive edge. Simultaneously, the development of respect and empathy are important factors. Students learn to respect the rights and needs of others in a disciplined setting, which promotes to their growth as compassionate and responsible persons. Schools' low resources, both in terms of time and staff, might be an additional impediment to efficient administration of instances of indiscipline.

A balanced and intelligent approach to student discipline in the classroom by teachers is particularly crucial for fostering a happy and productive learning environment. Open and courteous communication with students, along with clear standards and consistent enforcement of those norms, may aid in the establishment of effective discipline and a learning environment built on mutual trust. Fostering curiosity

and critical thinking may help kids become more motivated and involved in their study, which is important for developing social and academic abilities.

The findings of the study show that respondents are concerned about and eager to increase communication and cooperation between school, family, and community. This reflects a recognition of the significance of effective cooperation among all stakeholders engaged in education. With 79.17% of respondents, the most preferred choice is the organizing of events and activities that bring together school, family, and community. It highlights the goal to build bridges between different organizations in order to foster beneficial relationships and enhance collaborations. Regular meetings between teachers, parents, and community members (70.83%), as well as the development of volunteering programs and partnerships with local organizations (70.83%), are also highly regarded and demonstrate a strong desire to establish a constant dialogue and to actively involve parents and the community in school life. 58.33% of respondents cited the usage of contemporary communication tools such as online platforms and newsletters. This demonstrates an understanding of the importance of technology in promoting communication and remaining connected with parents and the community. We can say that the prospective teachers and starting teachers who took part in the study understand the necessity of fostering successful partnership with parents and the community. By incorporating all stakeholders, these activities and initiatives may greatly contribute to enhancing school atmosphere and boosting student growth.

A variety of factors contribute to pupils' improper conduct in the classroom. The study findings represent the respondents' thoughts on the elements that might lead to the onset of behavior issues in the school environment. The majority of respondents (81.25%) agree that the education obtained in the home setting, as well as pupils' unfulfilled needs (such as emotional and social), are key reasons of improper conduct. This underlines the family's vital role in children's development and implies that deficits or issues in home life may have a substantial influence on kids' conduct in school. A substantial majority of respondents (83.33%) name negative impacts from the social environment as a factor leading to improper conduct. This might include peer pressure or negative communal pressures. Academic pressure and stress are mentioned as reasons in student misbehavior by a lesser number of respondents (18.75%), but they should not be overlooked since they may have a

substantial influence on students' emotional condition and stress management abilities. 43.75% of respondents acknowledged certain instructors' improper attitudes. This highlights the significance of the teacher-student connection and the impact instructors may have on student conduct in the classroom. The framework's data reveal that there are various perceived reasons of student misconduct, which may be complicated and interwoven. In order to address these concerns, teachers and school personnel must be aware of the variety of variables that might impact student behavior and establish appropriate solutions to handle these obstacles.

The preferences and interests of respondents in different forms of continuing professional education programs in the areas of student behavior management and school violence prevention provide a clear picture of the areas of interest and priority in professional development for teachers. The majority of responders seem to be interested in programs and trainings that concentrate on the development of practical skills and the successful control of student conduct. This includes initiatives to prevent and fight bullying and school violence, as well as training in behavior management tactics and dispute resolution skills. Programs aiming at enhancing students' socio-emotional skills and applying positive pedagogy are also popular. Trainings on motivational approaches and active student engagement in learning, as well as those relating to personal growth and self-awareness for instructors, draw less interest. These data may be used to help design and improve in-service teacher education programs, enabling them to concentrate on teachers' actual needs and interests in regulating student behavior and maintaining a disciplined and safe school environment.

6. Conclusions

Understanding and clearly articulating the function of discipline in the classroom is critical for students training for a teaching profession as well as new instructors. Thus, discipline is more than just keeping order; it is also about providing a safe and inspiring atmosphere for pupils. Communication and cooperation among school, family, and community members are critical in fostering a disciplined and inspiring educational environment. Success in proper student behavior management is dependent on a comprehensive, constructive strategy that includes all players in a kid's school life.

Students in educational sciences and starting instructors have a realistic and well-founded

perspective of the causes of incorrect student conduct and its repercussions for the learning process. They recognize that improper conduct may have a detrimental impact on learning and that it is critical to discover underlying reasons in order to respond effectively. In addition, prospective educators and starting instructors must discover and create successful tactics and procedures for fostering proper and responsible conduct in the classroom. They understand the need of tailored methods and classroom management abilities in producing an effective and disciplined learning environment.

Students and starting teachers believe that initial and in-service training is critical in equipping them to manage student behavior and prevent and fight school violence. They see training to be an investment in gaining the abilities required to cope with particular issues in the educational setting.

It may be stated that today's students, tomorrow's potential educators, and starting instructors understand the complexities and necessity of handling discipline in a school setting, as well as the need for teamwork and ongoing training to be effective in their educational position.

Classroom discipline refers to the various techniques used by educators to regulate students' conduct and dispositions throughout the educational experience, with the goal of promoting compliance with institutional standards and fostering a safe, structured, and stimulating learning environment. This essay explores the current approaches and challenges that contemporary educational institutions face when dealing with classroom behavior control. This essay investigates the perceptions of aspiring and rookie educators on the need of discipline in the classroom. It emphasizes the need of good communication and cooperation among educational institutions, families, and communities in creating a welcoming and inspirational learning environment. This paper investigates the opinions of education science students and rookie instructors on the causes of improper student conduct and its influence on the educational process in the school environment. Furthermore, the paper recommends practical ideas and approaches for promoting responsible and proper conduct in the classroom. The paper emphasizes the need of both initial and ongoing professional development in successfully managing student conduct and preventing and responding to incidences of school violence.

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References

Afifah, R. N. A., & Ifnuari, M. R. (2022). Teacher strategies in class management to improve student discipline in elementary school. *JISAE: Journal of Indonesian Student Assessment and Evaluation, 8*(1), 1 - 9. https://doi.org/10.21009/jisae.v8i1.24828

Baker P. H.,. (2005) "Managing Student Behavior: How Ready Are Teachers to Meet the Challenge?" *American Secondary Education*, vol. 33, no. 3, pp. 51–64. *JSTOR*, http://www.jstor.org/stable/41064554.

Carson, R. L., Plemmons, S., Templin, T. J., & Weiss, H. M. (2011). "You are who you are:" A mixed-method study of affectivity and emotion regulation in curbing teacher burnout. In G. M. Reeve & E. Frydenberg (Eds.), *Personality, stress and coping. Implications for education*. Charlotte, NC: Information Age Publishing.

Cothran, D. J., Kulinna, P. H., & Garrahy, D. A. (2009). Attributions for and consequences of student misbehavior. *Physical Education and Sport Pedagogy, 14*(2), 155–167. https://doi.org/10.1080/17408980701712148

Doyle, W. (2006). Ecological approaches to classroom management. In C. Evertson & C. Weinstein (Eds.), *Handbook of classroom management: Research, practice, and contemporary issues* (pp. 97–125). New York: Lawrence Erlbaum

Evertson, C. M., & Weinstein, C. S. (Eds.). (2006). *Handbook of classroom management: Research, practice, and contemporary issues.* Lawrence Erlbaum Associates Publishers.

Evers WJ, Brouwers A. & Tomic W. (2002). *Burnout and self-efficacy: a study on teachers' beliefs when implementing an innovative educational system in the Netherlands.* Br J Educ Psychol.:227-43. doi: 10.1348/000709902158865. PMID: 12028610.

Grayson, J. L., & Alvarez, H. K. (2008). School climate factors relating to teacher burnout. A mediator model. *Teaching and Teacher Education: An International Journal of Research and Studies, 24*(5), 1349-1363. doi: :10.1016/j.tate.2007.06.005

Hochweber, J., Hosenfeld, I., & Klieme, E. (2014). Classroom composition, classroom management, and the relationship between student attributes and grades. *Journal of Educational Psychology*, 106(1), 289-300. doi: 10.1037/a0033829

Ingersoll, R. M., & Smith, T. M. (2003). The wrong solution to the teacher shortage. *Educational Leadership, 60*(8), 30–33, https://www.gse.upenn.edu/pdf/rmi/EL_TheWrongSolution_to_theTeacher Shortage.pdf

Lopes, J., & Oliveira, C. (2017). Classroom discipline: Theory and practice. In J. P. Bakken (Ed.), *Classrooms: Academic content and behavior strategy instruction for students with and without disabilities* (Vol. 2, pp. 231-253). New York: Nova Science Publishers

Kersaint, G., Lewis, J., Potter, R., & Meisels, G. (2007). Why teachers leave: Factors that influence retention and resignation. *Teaching and Teacher Education, 23*(6), 775-794. doi: 10.1016/j.tate.2005.12.004

Mitchell, M. M., & Bradshaw, C. P. (2013). Examining classroom influences on student perceptions of school climate: The role of classroom management and exclusionary discipline strategies. *Journal of School Psychology, 51*(5), 599-610. doi: 10.1016/j.jsp.2013.05.005

Oliver, R.M., & Reschly, D.J. (2007). *Effective Classroom Management: Teacher Preparation and Professional Development*. TQ Connection Issue Paper.

Osher, D., Bear, G. G., Sprague, J. R., & Doyle, W. (2010). How can we improve school discipline? *Educational Researcher*, 39(1), 48-58. doi: 10.3102/0013189X09357618

Sieberer-Nagler, K. (2015). Effective Classroom-Management & Positive Teaching. *English Language Teaching, 9*(1), 163. https://doi.org/10.5539/elt.v9n1p163

Simón, C., & Alonso-Tapia, J. (2016). Positive classroom management: Effects of disruption management climate on behaviour and satisfaction with teacher. *Revista de Psicodidactica, 21*(1), 65-86. doi: 10.1387/RevPsicodidact.13202

Tsouloupas, C. N., Carson, R. L., Matthews, R., Grawitch, M. J., & Barber, L. K. (2010). Exploring the association between teachers' perceived student misbehaviour and emotional exhaustion: The importance of teacher efficacy beliefs and emotion regulation. *Educational Psychology, 30*(2), 173-189. doi:10.1080/01443410903494460

Tsouloupas, C.N, "Examining the perceptions of teachers' efficacy in handling student misbehavior (TEHSM) in classroom and physical education settings" (2011). LSU Doctoral Dissertations. 2695. https://repository.lsu.edu/gradschool_dissertations/2695

Wiseman, D., & Hunt G., (2008). *Best practice in motivation and management in the classroom (2 nd ed)*. Springfield: Charles Thomas.

https://dexonline.ro/definitie/disciplina

https://www.merriam-webster.com/dictionary/discipline

A Pilot Study: Assessing the Synergy of Student Multidisciplinary Teamwork in Collaborative Projects

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A Pilot Study: Assessing the Synergy of Student Multidisciplinary Teamwork in Collaborative Projects

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Abstract	
Keywords: teamwork; assesment; multidisciplinary design collaboration; project based learning.	This pilot study delves into the efficacy of a novel scale, combining established measurements, to evaluate student teamwork in mixed collaborative environments. The article is split into two parts: the creation of the new scale and its application in evaluating four small heterogeneous groups' teamwork. Upon utilizing this newly developed scale to assess the diverse working teams, statistical analysis shows no significant differences in the three new dimensions, namely in communication skills (F=1.10, p=0.38), teamwork skills (F=0.20, p=0.89), or management skills (F=1.04, p=0.41). These findings suggest that despite variations in nationality, educational specializations, and gender, the teams displayed comparable competency in teamwork capabilities. The non-significant disparities underscore the potential effectiveness and equity of the new scale in appraising teamwork in diverse groups, emphasizing its utility in assessing cross-cultural and interdisciplinary collaborations. This research contributes with insights into evaluating and enhancing multidisciplinary teamwork, offering a possible instrument for fostering successful collaboration in varied student groups.

Zusammenfasung	
Schlüsselworte: Zusammenarbeit; Beurteilung; multidisziplinäre Designzusammenarbeit; Projekt basiertes lernen.	Diese Pilotstudie befasst sich mit der Wirksamkeit einer neuartigen Skala, die etablierte Messungen kombiniert, um die Teamarbeit von Studierenden in gemischten kollaborativen Umgebungen zu bewerten. Der Artikel ist in zwei Teile gegliedert: die Erstellung der neuen Skala und ihre Anwendung bei der Bewertung der Teamarbeit von vier kleinen heterogenen Gruppen. Bei Verwendung dieser neu entwickelten Skala zur Bewertung der vielfältigen Arbeitsteams zeigt die statistische Analyse keine signifikanten Unterschiede in den drei neuen Dimensionen, nämlich bei den Kommunikationsfähigkeiten (F=1,10, p=0,38) und den Teamfähigkeiten (F=0,20, p=0,89). oder Managementfähigkeiten (F=1,04, p=0,41). Diese Ergebnisse deuten darauf hin, dass die Teams trotz unterschiedlicher Nationalität, Bildungsspezialisierung und Geschlecht eine vergleichbare Kompetenz in der Teamarbeit zeigten. Die nicht signifikanten Unterschiede unterstreichen die potenzielle Wirksamkeit und Gerechtigkeit der neuen Skala bei der Bewertung der Teamarbeit in verschiedenen Gruppen und unterstreichen ihren Nutzen bei der Bewertung interkultureller und interdisziplinärer Zusammenarbeit. Diese Forschung liefert Einblicke in die Bewertung und Verbesserung multidisziplinärer Teamarbeit und bietet ein mögliches Instrument zur Förderung einer erfolgreichen Zusammenarbeit in verschiedenen Studentengruppen.

1. Introduction

In the dynamic landscape of education, the cultivation of essential skills extends far beyond individual academic prowess. Collaborative skills, teamwork, and collective problem-solving abilities have emerged as pivotal competencies for success in the modern world (Luk & Chan, 2022; Poole et al., 2021; Yang, 2023). The significance of teamwork in educational projects cannot be overstated, as it not only enhances academic learning but also nurtures social, emotional, and cognitive development.

Multidisciplinary settings show a confluence of diverse expertise, perspectives, and skills that are to be used in actual teamwork. Within this milieu, theories and models of teamwork stand as guiding lines, setting the path toward cohesive and effective collaboration. The imperative for successful multidisciplinary teamwork is underscored by the need to synthesize insights from various domains, fostering innovation and comprehensive problem-solving. This article embarks on an exploration of the theories, models, and fundamental factors that contribute to effective teamwork within multidisciplinary collaborative projects. By dissecting the core principles that underpin successful collaboration across disciplines, we seek to unveil the pivotal elements that propel teams towards collective achievement in multifaceted professional environments.

2. Theories and models of teamwork

Research emphasizes the significance of small, dedicated teams and their role in achieving success (Hoegl & Parboteeah, 2003; Poole et al., 2021; Sidorenkov & Borokhovski, 2023). Exploration of the prerequisites for establishing and managing effective teams underscores the significance of team composition, clear objectives, resource allocation, leadership, and external support. These fundamental insights serve as a cornerstone for comprehending and fostering successful teamwork.

Katzenbach and Smith's (1993) define a team as "a small group of people with complementary skills and a shared purpose and approach, which hold themselves mutually accountable for the team's success". The two researchers underline the importance of teams in achieving results that go beyond the capabilities of individual members. They emphasize the collective performance of a team that has a common goal that unites the members. They argue that this common objective is essential for creating a strong team identity. The authors also suggest that smaller groups are more agile, have clearer communication, and can focus better on tasks, fostering a higher level of camaraderie and mutual trust. Therefore, teamwork is regarded as "a social strategy built upon knowledge, attitudes, skills, and the ability to combine cognitive appreciation from all team members" (Jorgensen et al., 2019).

Hackman (2002) emphasizes the importance of designing teams deliberately. He suggests that a team's structure, composition, and tasks significantly impact its effectiveness. Hackman (2002) argues that teams work best when they have a compelling direction and a shared purpose. The author also stresses the importance of creating an environment where team members feel safe to express themselves. Teamwork also implies that the opinions of others are respected and the differences are handled so that the group can use the complementary experiences and knowledge (Chan & Luk, 2022).

3. The importance of teamwork in multidisciplinary settings

Teamwork is considered as an important soft skill for the workforce of industry 4,0 and 5,0 enterprises (Jorgensen et al., 2019, Polakova 2023). There are domains that see teamwork not only as a well-appreciated soft skill, but a fundamental capability that sets the ground of field competencies. Leading and participating in multidisciplinary teams is seen as a main task for food engineering (FE) (Saguy 2016).

The Accreditation Board for Engineering and Technology (ABET) gives accreditations to engineering programs primarily in the United States. In their 2019 criteria, one of the mandatory learning outcomes they specified was "the capability to operate efficiently as a valuable member of a technical team." Moreover, team-oriented design projects develop engineering students' collaboration skills and are appreciated in a capstone course context (Leonard, 2023).

As a result, teamwork competencies are considered highly relevant for the higher education in chemical engineering and related fields like food engineering and agricultural engineering (Tobajas 2019) and in ICT (Barr, 2019; Assayne 2022; Kokkoniemi 2023). There are program studies such as Chemical Engineering at University of Sao Paolo Brasilia or Monash University Malaysia that require specific competencies like the ability to work in multidisciplinary and transdisciplinary teams that are based also on transdisciplinary competencies like teamwork (Oliveira, 2023; Yan, 2022). These programs, in the discussion of developing future engineers, stress the need for the following elements as parts of competences: entrepreneurship, time/project management, thinking and acting reflectively, analysis and decision making, design thinking, leadership skills (or empathy), knowledge/lifelong learning, self-reliance, sustainability and the environment, internationality, teamwork, communication and cooperation. These elements are considered to be intrinsic to the engineering field.

Similarly, an attempt to align the learning objectives of the graduated Global Engineering study programs at the North American universities, MacDonald (2022) includes in his learning objectives Multidisciplinary Teamwork and Leadership. The graduates should use this ability to create a collaborative and inclusive environment for a diverse team and to establish goals, plan tasks and meet objectives in collaboration with the other member of this team

A review on studies on multidisciplinary design collaboration (i.e. how members of diverse teams that intend to produce creative outputs act, interact and collaborate) revealed that the key elements are communication and social interactions (Nguyen, 2022):

1. Communication. The process of design, as highlighted by Bucciarelli & Bucciarelli in 1994, is

inherently social. Social interactions play a crucial role in design activities, constituting about 21% of the time spent on conceptual design. Conversations and exchanges among individuals involved in design can aid in uncovering diverse perspectives, fostering the establishment of personal connections. The effectiveness of collaboration and corresponding the quality of design are very much influenced by the way in which tensions and emotions are handled during the collaborative design sessions (Detienne et al., 2012). Notably, cultural diversity holds as much importance as disciplinary diversity, as suggested by Jutraz and Zupancic (2017).

2. Knowledge and diversity, as the different disciplinary backgrounds generate the diversity of knowledge and experience.

3. Trust and context. The team members can create shared understanding only if they can establish a mutual agreement based on the contextual knowledge convergence.

4. Barrier and design communication. The visual representation are the essential tools for facilitating multidisciplinary communication.

5. Jargon and roles. Discussion should be encouraged in a context that stimulates imagination and idea exchange by team members assuming the role of collaboration facilitator so that jargon conflicts are avoided or overcome.

4. Key factors that contribute to effective teamwork in collaborative projects

Effective student teamwork in collaborative projects relies on several key factors that contribute to success. These factors include various elements that promote cohesion through communication skills, productivity through actual teamwork skills, and learning outcomes in terms of teamwork results.

Students need a clear understanding of the project's goals, their roles, and the expected outcomes. Establishing clear objectives helps in aligning efforts and focusing on the end goals (Yang, 2023). Studies show that a diverse team brings varied perspectives, skills, and strengths. Combining individuals with different backgrounds, expertise, and experiences can lead to innovative problem-solving and a rich learning environment (Bell et al., 2011). Open and effective communication is essential. Encouraging active and respectful dialogue among team members fosters collaboration and knowledge sharing (da Silva et al., 2015; Johnson & Johnson, 2009). These aspects

transcend the possible barriers of language and move into a more intimate zone of communication.

Establishing ground rules and setting clear roles and responsibilities are also key factors to effective student teamwork (Alsaleh, 2020; Johnson & Johnson, 2009; Mead & Scharmann, 1994). Setting team norms and guidelines helps in structuring interactions and managing conflicts. It ensures that everyone understands the expectations, timelines, and behavioral standards within the team. Clearly defining individual roles and responsibilities within the team avoids ambiguity and ensures accountability. When everyone knows their specific tasks, it prevents duplication of efforts and ensures progress. Also, mentorship of peers that passed the course can positively influence the teamwork performance and reduce the team dysfunctionalities (Iacob, 2020).

Conflicts are inevitable in group work, especially when team members don't speak their native language. Teaching students how to manage conflicts constructively, listen actively, and find common ground is essential for successful collaboration. Sometimes, not using the mother tongue language helps in giving time to comprehend the possible conflict situations (De Dreu & Weingart, 2003). Also, incorporating peer feedback and evaluation allows students to assess their own and others' contributions. It encourages accountability, fairness, and improvement in teamwork (Falchikov, 2005). Diverse team members' backgrounds can offer a fresh perspective when giving feedback.

The efficacy of student teamwork in collaborative projects depends upon a comprehensive integration of multifaceted elements. Establishing a conducive environment where clear communication, structured roles, and diversified perspectives intersect is vital. The factors presented enhance the learning experience and nurture essential skills. Recognizing the significance of these factors and their interconnectedness is decisive for teachers aiming to cultivate a dynamic and productive collaborative learning environment. As the landscape of education continues to evolve, fostering these elements will remain pivotal in preparing students for the challenges within specific work domains.

5. Methodology

In this study, it is important to note that the research undertaken serves as a pilot investigation, laying the foundation for future, more extensive research endeavors. Our primary objective was to develop and validate a novel scale for assessing

teamwork characteristics by combining two previously verified scales (Kiesewetter & Fischer, 2015a; Liu et al., 2022). By conducting this pilot study, we aimed to measure the efficacy of the new scale while also identifying any potential refinements required for its successful implementation in future research. The use of established scales provided a robust starting point for our assessment of multidisciplinary student teamwork, ensuring that the new scale maintained the reliability and validity. The results of this pilot study contribute to the ongoing effort to enhance the precision and applicability of teamwork measurement tools for this specific pilot study that aimed to also answer to the following research questions:

Can the combination of two established scales, one measuring team coordination, team cooperation, information exchange, team adjustment behaviors and the other assessing constructive controversy, helping behaviors, spontaneous communication and team creativity, yield a more cohesive and effective scale for evaluating teamwork performance in a mixed collaborative work environment?

How does the composition of multidisciplinary teams, in terms of members' diverse culture, study backgrounds and language, impact the efficiency and quality of teamwork?

5.1. Participants

The study comprised a diverse group of 17 participants, with 6 individuals hailing from Norway and 11 from Romania. The participants were predominantly female, with 10 women contributing to the study, while 5 participants identified as male, and 2 individuals opted not to declare their gender. This age range was between 19 and 27 years old. 13 of the participants had specialized in the field of Information Technology (IT), while the remaining 4 participants specialized in Food-related disciplines.

Prior to their involvement in the research, all participants were provided with a comprehensive explanation of the study's objectives, procedures, and benefits. Additionally, participants were informed about the measures taken to protect their privacy and confidentiality, including the secure handling of their data. Only after participants had an opportunity to ask questions and express their willingness to participate by signing the consent forms did the data collection process begin.

Participants were mixed and grouped in 4 heterogeneous teams, as described below.

Team 1

In this first team, 2 students were from Norway and 2 from Romania. Within this group, there were 3 males and 1 female. In terms of their academic specialization, the participants were evenly divided, with 3 studying Information Technology (IT) and 1 focusing on Food-related disciplines.

Team 2

In the second team, 1 student was from Norway and 2 from Romania. Within this group, there were 1 male and 2 did not declare the gender. In terms of their academic specialization, the participants were evenly divided, with 1 studying Information Technology (IT) and 1 focusing on Food-related disciplines.

Team 3

In the third team, 2 students were from Norway and 3 from Romania. Within this group, there were 3 males and 2 females. In terms of their academic specialization, the participants were evenly divided, with 4 studying Information Technology (IT) and 1 focusing on Food-related disciplines.

Team 4

In the fourth team, 1 student was from Norway and 4 from Romania. Within this group, there were 3 males and 2 females. In terms of their academic specialization, the participants were evenly divided, with 4 studying Information Technology (IT) and 1 focusing on Food-related disciplines.

5.2. Educational context

The students were participating in the second Summer school organized in the framework of the MAPIoT program (MAPIOT 2021). The purpose of the project is to develop the needed capabilities for the adoption of digital technologies in the Agrofood businesses especially in small and medium businesses (Florea 2023). The summer schools were designed as testbeds for methods to teach the digital skills for the workforce of this business. The lack of such a workforce is one of the main causes of the slow adoption of digital technologies in the agrifood sector. The development of suitable teaching methods that should form the digital competencies but also the transversal competencies as teamwork and working in a multidisciplinary environment required for the implementation and use of the digital technologies in agrifood was identified as a need that should be solved by the project (Berntzen 2022).

During the two weeks of the summer school the students had a mix of practical courses and field visits in IT business producing equipment and technologies for the digitalisation of the agri- food sectors and in agrifood business implementing or intending to implement digital technologies. The main approach was that the students have hands-on contact with technologies during the courses, see the process of developing the technologies in the IT business and know the real needs and problems of agrifood business implementing digitalisation. At the end of the school the students developed using the technologies they learned during the summer school - in a Hackathon manner - an IT solution for a problem they identified in the visits.

The learning unit "C4 Digital design of food manufacturing processes – theory and applications" was selected for the pilot study for multiple reasons:

- it introduces a modeling and simulation tool that:

o utilizes a simple graphical language which eases the development of models;

o allows a description of the systems that the students have encountered in their visits giving them a common ground for discussions and reasoning;

o supports the rapid designs of multiple solution.

- it was at the end of the second week, so:

o the team members had the time to know each other and to develop teamwork and multidisciplinary skills;

o the students had done the visits on field, so they had examples of potential agrifood systems in which to implement their solution;

o it was before the final Hackathon when the students would develop an IT based solution for a problem they encountered in their visits on field.

The learning unit was divided in two parts - one dedicated to learning the modeling and the other to simulation methods and tools. This was performed through learning by doing. The teacher models one component of an agrifood production system (like reservoirs, machines, transport systems, robots, workers) and the teams had to reproduce this modeling and simulation example and then they received the task to model a component of the same type. An example of how to connect the models of components in the model of a production systems was also presented and reproduced by the students.

In the second part, each team developed a model of the systems that were relevant for the implementation of the IT solution in the final Hackathon. They selected the relevant components, they modeled them and connected them in the model of the complete system. They verified and validated the model through simulation using data from the enterprises they visited.

The four modeled system were:

- Tomato sauce producing plant (Team 3)
- Wine producing plant (Team 2)
- Internet of things (IoT) monitored farm (Team 1)
- Drone monitored farm (Team 4)

5.3. Instruments

The Teamwork Assessment Scale (Kiesewetter & Fischer, 2015b) is a specialized instrument developed to evaluate the quality of teamwork among undergraduate medical students during simulated ward rounds. The scale likely includes a set of well-defined and structured items or criteria designed to measure various aspects of teamwork. These criteria could encompass elements such as effective communication, collaboration, leadership, task distribution, and adaptability. Each item within the scale would likely be rated on a standardized scale, allowing observers to assess the extent to which students exhibit these teamwork behaviors.

The Taiwanese Team Interactions and Team Creativity Instrument (TITC-T) (Liu et al., 2022) is a particular assessment tool designed to measure team interactions and creativity within the context of nursing education. The scale likely encompasses a set of structured items or criteria that are carefully crafted to evaluate team interactions and creativity among nursing students. The items may focus on various facets of teamwork, such as communication, cooperation, leadership, and problem-solving skills, which are particularly crucial in the healthcare setting. Moreover, the scale is likely to assess the students' ability to generate innovative solutions and ideas, which is essential in nursing practice.

In the context of evaluating teamwork aspects in heterogeneous working groups, characterized by the inclusion of members from diverse countries, diverse educational specializations, and genders, the previously employed scales fell short in capturing the intricate dynamics at play. Notably, none of the team

members, when collaborating, utilized their native languages; instead, they relied on English as the lingua franca. This language dynamic introduced an additional cultural layer of complexity, as the scales might not have been designed to account for the potential communication challenges, subtle cultural nuances. Furthermore, the diverse composition of these groups, encompassing individuals from various academic backgrounds and cultural contexts, rendered it essential to assess how well the scales adapted to these heterogeneous settings. The limitations of the existing scales in accommodating these variables underscore the necessity of developing a more contextually relevant assessment tool capable of effectively measuring teamwork in diverse and globally integrated work environments.

5.4. Procedure

The procedure for this pilot study is divided into two sections: first, generating the new scale, and second verifying the scale in an actual teamwork with the 4 heterogeneous groups.

Generating the new scale

For creating a new scale, we used factor analysis, which has suggested three new dimensions labeled as "Communication Skills," "Teamwork Skills," and "Management Skills".

6. Results

In this study, Cronbach's Alpha was use to assess the internal consistency of the Communication, Teamwork and Management skills. The resulting coefficients where 0.881 for the Communication skills, 0.857 for the Teamwork skills and 0.776 for the Management skills.

The overall reliability for the 18 items scale was 0.894.

For the management skills dimension, in order to gain more structure, item Q7 was removed from scale.

Verifying the scale in an actual teamwork

After applying the newly developed scale to assess the four heterogeneous working teams, the results from the analysis of variance (ANOVA) revealed that there were no statistically significant differences among the teams in terms of their communication skills (F=1.10, p=0.38), teamwork skills (F=0.20, p=0.89), or management skills (F=1.04, p=0.41) (Table 1).

Table 1. ANOVA for group skills

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
comm_skills	Between Groups	44,568	3	14,856	1,100	,384
	Within Groups	175,550	13	13,504		
	Total	220,118	16			
teamwork_skills	Between Groups	10,913	3	3,638	,207	,890
	Within Groups	228,617	13	17,586		
	Total	239,529	16			
man_skills	Between Groups	1,532	3	,511	1,046	,405
	Within Groups	6,350	13	,488		
	Total	7,882	16			
skillstotal	Between Groups	52,348	3	17,449	,304	,822
	Within Groups	747,417	13	57,494		
	Total	799,765	16			

7. Discussions

For generating the new scale, we begin by compiling a comprehensive list of 17 items that pertain to teamwork aspects, starting from the two cited scales. These items were designed to cover a broad range of behaviors and competencies within each dimension. We administered the initial set of items to the sample of participants, grouped in 4 teams. This testing phase aims to evaluate the clarity and relevance of the items and gather preliminary data for factor analysis.

We collected responses and performed an EFA to identify the underlying factor structure of the scale. Based on the results of the EFA, to choose the items that load most strongly on each other, the Rotated Component Matrix suggested the 3 dimensions. After finalizing the items, conduct a CFA to validate the factor structure. CFA confirmed that the selected items align well with the proposed dimensions, namely "Communication Skills," "Teamwork Skills," and "Management Skills". Using these dimensions, we tested the new scale with the four teams.

The results indicate that the teams, despite their diversity in nationality, education specializations, and gender, demonstrated comparable levels of competence in these essential teamwork skills. The non-significant differences also highlight the potential effectiveness and fairness of the new scale in evaluating teamwork performance in diverse working groups, underscoring its utility as a valuable instrument for assessing cross-cultural and interdisciplinary collaboration.

8. Limitations

One of the primary limitations of this article is the relatively small number of participants included in the study. The sample size of participants, which was

limited to 17 students, may constrain the generalizability of the findings to a broader population. A larger and more diverse sample would provide a more comprehensive representation of the diversity inherent in heterogeneous working groups, thereby enhancing the study's external validity. This limitation underscores the need for further research with larger sample sizes to confirm the robustness of the newly developed scale and to explore potential variations in teamwork skills across a more extensive range of contexts and participants.

9. Conclusions

This study provides affirmative answers to the two fundamental research questions. Firstly, the combination of two established scales measuring diverse teamwork dimensions, including team coordination, cooperation, information exchange, team adjustment behaviors, constructive controversy, helping behaviors, spontaneous communication, and team creativity, indeed yielded a more cohesive and effective scale for evaluating teamwork performance in a mixed collaborative work environment. The amalgamation of these scales allowed for a more comprehensive assessment, addressing various facets of teamwork, thereby providing a more cohesive perception of teamwork dynamics.

Secondly, this study highlights that despite the significant influence of multidisciplinary team composition, characterized by members from diverse cultural backgrounds, study specializations, and language proficiency, the efficiency and quality of teamwork was not affected. It underscores that diverse teams, while offering unique perspectives and experiences, can perform with remarkable uniformity, as evidenced by the non-significant differences in teamwork skills across groups. This study contributes to our understanding of teamwork evaluation in diverse work environments and emphasizes the applicability of the new scale in such settings, thus supporting its utility in cross-cultural, multidisciplinary collaborations.

Acknowledgments

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References

Accreditation Board for Engineering and Technology. (2019). *Criteria for Accrediting Engineering Programs*. ABET, pp. 2020–2021.

Alsaleh, N. J. (2020). Teaching Critical Thinking Skills: Literature Review. *TOJET: The Turkish Online Journal of Educational Technology,* 19 (1).

Assyne, N., Ghanbari, H., Pulkkinen, M. (2022). The essential competencies of software professionals: A unified competence framework. *Information and Software Technology*, 151, 107020, ISSN 0950-5849, https://doi.org/10.1016/j.infsof.2022.107020.

Barr, M., Parkinson, J. (2019). Developing a work-based software engineering degree in collaboration with industry. In: *Proceedings of the 2019 Conference on United Kingdom & Ireland Computing Education Research*. pp. 1–7.

Bell, S. T., Villado, A. J., Lukasik, M. A., Belau, L., & Briggs, A. L. (2011). Getting specific about demographic diversity variable and team performance relationships: A meta-analysis. *Journal of Management*, 37(3), pp. 709–743. https://doi.org/10.1177/0149206310365001

Berntzen, L., Florea A. (2022). Design Thinking Applied to the Internet of Things - A Project on Technological Innovation in Agriculture and Food Processing, *ICDS 2022, The Sixteenth International Conference on Digital Society*, Porto, Portugal, pp. 44-49, ISSN: 2308-3956

Chan, C.K.Y., Luk, L.Y.Y. (2022). Studies in Educational Evaluation Academics' beliefs towards holistic competency development and assessment: a case study in engineering education. *Stud. Educ. Eval.* 72, 101102 https://doi.org/10.1016/j. stueduc.2021.101102.

da Silva, F. M., Neto, F. M. M., Burlamaqui, A. M. F., Demoly, K. R. do A., & Pinto, J. P. de F. (2015). Providing an Extension of the SCORM Standard to Support the Educational Contents Project for t-Learning. *Creative Education*, 06 (11), pp. 1201–1223. https://doi.org/10.4236/CE.2015.611118

De Dreu, C. K. W., & Weingart, L. R. (2003). Task Versus Relationship Conflict, Team Performance, and Team Member Satisfaction: A Meta-Analysis. https://doi.org/10.1037/0021-9010.88.4.741

Falchikov, N. (2005). *Improving assessment through student involvement: practical solutions for aiding learning in higher and further education*. RoutledgeFalmer. https://www.routledge.com/Improving-Assessment-thr

Florea, A., Popa, D. I., Morariu, D., Maniu, I., Berntzen, L., & Fiore, U. (2023). Digital farming based on a smart and user-friendly IoT irrigation system: A conifer nursery case study. *IET Cyber-Physical Systems: Theory & Applications*. 1–19, https://doi.org/10.1049/cps2.12054

Hackman, J. R. (2002). *Leading teams: setting the stage for great performances*. https://books.google.com/books/about/Leading_Teams.html?hl=ro&id=wkgxCgAAQBAJ

Hoegl, M., & Parboteeah, K. P. (2003). Goal Setting and Team Performance In Innovative Projects: Http://Dx.Doi.Org/10.1177/1046496402239575, 34 (1), pp. 3–19. https://doi.org/10.1177/1046496402239575

Iacob, C., & Faily, S., (2020). The Impact of Undergraduate Mentorship on Student Satisfaction and Engagement, Teamwork Performance, and Team Dysfunction in a Software Engineering Group Project. *SIGCSE '20: Proceedings of the 51st ACM Technical Symposium on Computer Science Education*, pp. 128–134, https://doi.org/10.1145/3328778.3366835

Johnson, D. W., & Johnson, R. T. (2009). An educational psychology success story: Social interdependence theory and cooperative learning. *Educational Researcher*, 38 (5), pp. 365–379. https://doi.org/10.3102/0013189X09339057

Jorgensen, S., Arce-Trigatti, A., Allen Mathende, S. B., Cain, A. H., Sanders, J. R., Arce, P. E. (2019). *An Activity to Illustrate Teamwork: An Introduction to the Renaissance Foundry Model Through Mindful Abstraction*

Katzenbach, J., & Smith, D. K. (1993). *The discipline of teams*. Harvard Business Review.

Kiesewetter, J., & Fischer, M. R. (2015). The Teamwork Assessment Scale: A Novel Instrument to Assess Quality of Undergraduate Medical Students' Teamwork Using the Example of Simulation-based Ward-Rounds. GMS Zeitschrift Fur Medizinische Ausbildung, 32 (2). https://doi.org/10.3205/ZMA000961

Kokkoniemi, M., Isomöttönen, V.. (2023). A systematic mapping study on group work research in computing education projects. *Journal of Systems and Software*. 204. 111795. 10.1016/j.jss.2023.111795.

Leonard, A., Guanes, G., & Dringenberg, E. (2023). Undergraduate students' beliefs about diverse approaches to making engineering design decisions: Exploring change during a capstone course. *International Journal of Technology and Design Education*, pp. 1–31.

Liu, H. Y., Sung, S. C., Chao, C. Y., Chen, N. H., Chen, H. F., & Wu, S. M. (2022). Development and Psychometric Testing of a Taiwanese Team Interactions and Team Creativity Instrument (TITC-T) for Nursing Students. *International Journal of Environmental Research and Public Health*, 19 (13). https://doi.org/10.3390/IJERPH19137958

Modernizing Agricultural Practice using Internet of Things (MAPIOT) project site https://digifof.omilab.ulbsibiu.ro/psm/content/mapiot/info?view=activities

Mead, J. M., & Scharmann, L. C. (1994). Enhancing Critical Thinking Through Structured Academic Controversy. *American Biology Teacher*, 56 (7), pp. 416–419. https://doi.org/10.2307/4449872

MacDonald, L., Thomas, E., Javernick-Will, A., Austin-Breneman, J., Aranda, I., Salvinelli, C., Klees, R., Walters, J., Parmentier, M., Schaad, D., Shahi, A., Bedell, E., Platais, G., Brown, J., Gershenson, J., Watkins, D., Obonyo, E., Oyanedel-Craver, V., Olson, M., Linden, K. (2022). Aligning learning objectives and approaches in global engineering graduate programs: *Review and recommendations by an interdisciplinary working group. Development Engineering*. 7. 100095. 10.1016/j.deveng.2022.100095.

Nguyen, M., Mougenot, C.A. (2022). Systematic review of empirical studies on multidisciplinary design collaboration: Findings, methods, and challenges, *Design Studies*, 81, 101120, ISSN 0142-694X, https://doi.org/10.1016/j.destud.2022.101120.

Oliveira, R., Hipólito, G., Pontes, R., Ferreira, P., Moreira, R., Plácido, J., Silva, C., Tovar, L. (2023). Transdisciplinary Competency-based Development in the Process Engineering Subjects: A Case Study in Brazil. *Education for Chemical Engineers*. 44. 10.1016/j.ece.2023.05.007.

Poláková, M, Horváthová Suleimanová, J., Madzík, P., Copuš, L., Molnárová, I., Polednová, J. (2023). Soft skills and their importance in the labour market under the

conditions of Industry 5.0, *Heliyon,* 9 (8), e18670, ISSN 2405-8440, https://doi.org/10.1016/j.heliyon.2023.e18670.

Poole, M. S., Dobosh, M. A., Keyton, J. (2021). Group Communication Theory: New Theories and Perspectives. *The Emerald Handbook of Group and Team Communication Research*, 45–52. https://doi.org/10.1108/978-1-80043-500-120211005

Reyes, L., Reedy, A., Guerrero Farías, M., Pradilla, D. (2020). Improving employability skills through non-placement work-integrated learning in chemical and food engineering: A case study. *Education for Chemical Engineer*s. 33. 10.1016/j.ece.2020.09.002.

Saguy, I. S.,Cohen, E. (2016). Food engineering: Attitudes and future outlook, *Journal of Food Engineering,* 178, pp. 71-80, ISSN 0260-8774, https://doi.org/10.1016/j.jfoodeng.2016.01.009.

Sidorenkov, A. V., & Borokhovski, E. F. (2023). The Role of Cohesion and Productivity Norms in Performance and Social Effectiveness of Work Groups and Informal Subgroups. *Behavioral Sciences*, 13(5). https://doi.org/10.3390/BS13050361

Tobajas, M., Molina, C.B., Quintanilla, A., Alonso-Morales, N., Casas, J.A. (2019). Development and application of scoring rubrics for evaluating students' competencies and learning outcomes in Chemical Engineering experimental courses. *Educ. Chem. Eng.* 26, 80–88

Yang, X. (2023). A Historical Review of Collaborative Learning and Cooperative Learning. *TechTrends*, 67(4), 718–728. https://doi.org/10.1007/S11528-022-00823-9/TABLES/2

Yap, J.S., Tan, J. (2022). Lifelong learning competencies among chemical engineering students at Monash University Malaysia during the COVID-19 pandemic. *Educ. Chem. Eng.* 38, 60–69. https://doi.org/10.1016/j.ece.2021.10.004.

Adapting the Education and Training System to Technological Evolution

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Adapting the Education and Training System to Technological Evolution

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Abstract	
Keywords: pedagogical approach; technology; education; learning; digital resources; pedagogy.	Teachers have faced the challenge of adjusting their pedagogical approaches and teaching methods to help students with disabilities adapt to the distance education context, often without specific training or adequate resources. To address these challenges, the "Do IT Yourself" project aims to increase the involvement of students with disabilities in digital education. Its primary focus is promoting "innovative practices in the digital age" with a two-fold approach: encouraging social inclusion and using technological means to integrate vulnerable student groups. This study aims to highlight teachers' digitisation needs and the digital tools they use in the classroom. The data obtained supporting this quantitative study are part of the Erasmus Plus "Do It Yourself" project, of which Romania is a part, together with Portugal, Italy, Finland and Slovenia. The main objective of this study is to obtain data on the digitisation of education in Romania. The present study applies a research method that focuses on completing structured questions. In this research, 79 participants were involved, representing both pre-university teachers and school principals. The data collection process was carried out using a questionnaire consisting of 12 questions to evaluate the type of digital resources used in the teaching environment, the frequency of their use, and the level of training of the participants regarding the training courses for the integration of the tools digital or self-taught learning.

Zusammenfasung	
Schlüsselworte: pädagogischer Ansatz; Technologie; Bildung, Lernen; digitale Ressourcen; Pädagogik.	Lehrkräfte standen vor der Herausforderung, ihre pädagogischen Ansätze und Lehrmethoden anzupassen, um Schülern mit Behinderungen bei der Anpassung an den Kontext des Fernunterrichts zu helfen, oft ohne spezielle Ausbildung oder angemessene Ressourcen. Um diesen Herausforderungen zu begegnen, zielt das Projekt „Do IT Yourself" darauf ab, die Beteiligung von Studierenden mit Behinderungen an der digitalen Bildung zu erhöhen. Sein Hauptaugenmerk liegt auf der Förderung „innovativer Praktiken im digitalen Zeitalter" mit einem zweifachen Ansatz: der Förderung der sozialen Inklusion und der Nutzung technologischer Mittel zur Integration gefährdeter Studentengruppen. Diese Studie zielt darauf ab, den Digitalisierungsbedarf von Lehrkräften und die digitalen Tools, die sie im Unterricht verwenden, hervorzuheben. Die für diese quantitative Studie gewonnenen Daten sind Teil des Erasmus Plus-Projekts „Do It Yourself", an dem Rumänien zusammen mit Portugal, Italien, Finnland und Slowenien beteiligt ist. Das Hauptziel dieser Studie besteht darin, Daten zur Digitalisierung der Bildung in Rumänien zu erhalten. Die vorliegende Studie wendet eine Forschungsmethode an, die sich auf die Beantwortung strukturierter Fragen konzentriert. An dieser Untersuchung waren 79 Teilnehmer beteiligt, darunter sowohl voruniversitäre Lehrkräfte als auch Schulleiter. Der Datenerhebungsprozess wurde mithilfe eines Fragebogens durchgeführt, der aus 12 Fragen bestand, um die Art der im Unterrichtsumfeld verwendeten digitalen Ressourcen, die Häufigkeit ihrer Nutzung und den Schulungsstand der Teilnehmer in Bezug auf die Schulungen zur Integration der zu bewerten digitale Tools oder autodidaktisches Lernen.

1. Introduction

The inexorable march of technological and digital evolution has fundamentally reshaped the dynamics of human interaction with information and the process of learning. Within this transformative context, education and training systems stand at a pivotal juncture, confronted by an array of formidable challenges and promising opportunities as they endeavor to recalibrate themselves in response to this evolving landscape. It is imperative for these systems to embark on a comprehensive reassessment of their theoretical underpinnings, meticulously realigning their strategies to ensure the delivery of education that remains pertinent and practical within an increasingly digitized world. The conventional, teacher-centric instructional model, a mainstay for centuries, is undergoing a profound metamorphosis, giving way to pedagogical approaches that place the student at the epicenter of the learning experience. Technology is not merely an accessory but an indispensable cornerstone in this shifting paradigm, enabling students to access an unprecedented wealth of information while concurrently nurturing the cultivation of critical thinking and problem-solving skills (Smith, 2018). This dynamic transformation underscores the urgency for educational institutions to embrace innovation and adapt to the ever-evolving educational landscape.

2. Theoretical foundation

One of the cornerstone theories guiding the transformation of educational systems in response to the ever-evolving technological landscape is constructivism. As elucidated by Piaget (1972), this theory posits that learning is a dynamic process unfolding as students construct knowledge based on their prior experiences and interactions within their social milieu. Within this framework, technology emerges as a powerful ally, as it can be seamlessly integrated into the educational journey to furnish students with interactive experiences and authentic learning environments. Such integration, in turn, fosters the cultivation of critical thinking and problem-solving skills, nurturing adaptable, tech-savvy learners.

Furthermore, the infusion of technology into education opens a Pandora's box of flexible and distance learning possibilities. Online learning platforms and collaborative tools have ushered in an era of unprecedented accessibility, enabling individuals to partake in educational pursuits at their own convenience, unfettered by geographical or socio-economic constraints (Garrison & Kanuka, 2021). However, maintaining a delicate equilibrium between virtual learning and the traditional classroom environment's social interactions becomes paramount (Rheingold, 2019). Striking this balance ensures that students benefit from the best of both worlds, reaping the rewards of technology's outreach while honing their interpersonal skills and enriching their educational experience with face-to-face encounters.

The incorporation of technology in education finds a solid theoretical foundation in connectivism, as proposed by Siemens in 2004. This paradigm contends that learning is inherently tied to the vast networks of connections and digital resources available in our modern age (Pascariu, 2017). In alignment with this model, education systems can harness the power of online resources, collaborative learning platforms, and social networks to foster learning environments where students can draw knowledge from diverse sources and refine their abilities to navigate the intricate digital landscape. In essence, this perspective underscores the importance of creating a learning ecosystem that is not confined to the boundaries of a traditional classroom but rather spans the vast digital expanse, enabling students to develop crucial digital literacy skills alongside their academic knowledge (Muntean, 2017).

The theory of differentiated pedagogy, articulated by Tomlinson in 1999, can seamlessly transition into the digital era, offering the potential for highly personalized instruction through technology. By meticulously analyzing the data generated by digital platforms, educators gain insights into the unique needs, learning paces, and preferences of each individual student. Armed with this information, they can adeptly tailor their teaching strategies, ensuring that students receive instruction that is finely tuned to their specific requirements. This personalized approach transcends the one-size-fits-all model, maximizing the potential for student success while fostering a more inclusive and supportive learning environment. In sum, the marriage of connectivism and differentiated pedagogy with technology in education not only broadens the horizons of learning but also enhances its depth, enabling students to navigate the digital realm while receiving instruction finely tuned to their distinctive needs. The theory of Constructivism, as originally proposed by Vygotsky in 1978, offers invaluable guidance for shaping the educational landscape in the digital age. The evolution of technology has paved the way for innovative educational tools, such as e-learning platforms, simulations, and educational games, which align perfectly with the core tenets of Constructivism. In this educational framework, students are regarded as active participants in their own learning journey, responsible for constructing knowledge through their experiences and interactions. In the digital realm, these experiences can manifest as immersive simulations, engaging e-learning modules, and interactive educational games. These technologies captivate students and facilitate practical skill development by providing hands-on experiences in a safe and controlled environment.

However, a well-rounded approach to digital education must encompass more than just practical skill development. The theory of critical pedagogy, first elucidated by Freire in 1970, plays a pivotal role in shaping the holistic development of students. Critical pedagogy emphasizes cultivating critical thinking skills, empowering students to become conscious and active citizens who can analyze and contribute meaningfully to society. In the digital landscape, technology has become a potent ally in this endeavor. It grants students access to a wealth of information, diverse perspectives, and a multitude of voices, fostering an environment where healthy debates and critical analysis thrive. By leveraging technology in this manner, educators can equip students with the tools and mindset necessary to engage with complex issues, challenge established

norms, and participate in constructive discourse (Muntean et al., 2021).

Constructivism theory (Vygotsky, 1978) can be applied to guide learning in the digital environment. E-learning platforms, simulations, and educational games can stimulate students' active participation and practical skill development.

The theory of critical pedagogy (Freire, 1970) can be brought up to ensure a well-balanced approach. This theory emphasises the importance of critical learning and developing critical thinking among students to transform them into conscious and active citizens. Technology can facilitate access to diverse information and multiple perspectives, encouraging debate and critical analysis.

3. Research methodology

The research method employed in this study is centered on utilizing a meticulously crafted structured questionnaire. This questionnaire has been designed to delve into various dimensions of incorporating technology within the educational realm. The cohort of participants selected for this research endeavour encompasses 79 individuals from the pre-university education system. Among these participants, we find a mix of educational professionals, including teachers and school principals.

The primary objective underpinning the deployment of this questionnaire, which consists of a comprehensive set of 12 inquiries, is to shed light on the multifaceted landscape of digital materials used in educational instruction. Additionally, it endeavours to discern the frequency with which these digital resources are integrated into the teaching and learning processes.

Beyond merely scrutinizing the technical facets of technology integration in education, our study takes a holistic approach by honing in on the participants' professional development with regard to technology. The questionnaire thoughtfully encompasses inquiries about the participants' engagement in training programs geared towards harnessing digital tools in education. Moreover, it delves into their self-perceived confidence levels concerning their aptitude for self-directed learning within this technological context. This multi-dimensional approach ensures a comprehensive examination of the influence of technology on the educational landscape, encompassing both its practical application and the preparedness of educational professionals to embrace its advantages. The study conducted in Romania

regarding the use of digital technologies in education. It includes various tables, graphs, and survey questions along with responses. Here's a summary of the key findings from the data:

Participants' Positions: The study included participants from Romania, primarily educators/teachers (93.7%). A smaller percentage included school managers/department heads (5.1%) and other education system employees (1.3%).

Table 1. Participant batch from Romania

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Educator/Teacher	74	93.7	93.7	93.7
	Other	1	1.3	1.3	94.9
	School manager/Head of the department	4	5.1	5.1	100.0
	Total	79	100.0	100.0	

Use of Digital Lessons: Most participants (94.9%) from Romania reported using digital tools and digital lessons in their teaching, learning, and school assessment activities. This suggests a strong adoption of digital teaching methods in Romanian educational institutions.

Table 2. The use of digital lessons in school-type activities in educational institutions in Romania

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	4	5.1	5.1	5.1
	Yes	75	94.9	94.9	100.0
	Total	79	100.0	100.0	

Ways to Implement Digital Lessons: The primary ways participants in Romania implemented digital lessons in school activities were through videos (38%), interactive content (35.4%), and online teacher's digital teaching materials (21.5%).

Table 3. Ways to implement digital lessons in school activities

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	As interactive content	28	35.4	35.4	35.4
	As videos	30	38.0	38.0	73.4
	As virtual reality technology	1	1.3	1.3	74.7
	I don't teach digitally	1	1.3	1.3	75.9

	Frequency	Percent	Valid Percent	Cumulative Percent
No	1	1.3	1.3	77.2
Online teacher's digital teaching material	17	21.5	21.5	98.7
As PDFs,	1	1.3	1.3	100.0
Total	79	100.0	100.0	

Digital Technologies in the Classroom: The most commonly used digital technologies in the classroom by Romanian participants were computers/laptops (55.7%), smartboards, tablets with apps (12.7%), and smartphones (11.4%).

Table 1.4. The categories of digital technologies used in the classroom in educational institutions in Romania

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	computers, Smartboards, Tablets with apps	2	2.5	2.5	2.5
	Computers/laptops	44	55.7	55.7	58.2
	Interactive online software (3D)	1	1.3	1.3	59.5
	No	2	2.5	2.5	62.0
	Smart boards	10	12.7	12.7	74.7
	Smartphones	9	11.4	11.4	86.1
	Tablets with apps	10	12.7	12.7	98.7
	the teacher uses	1	1.3	1.3	100.0
	Total	79	100.0	100.0	

4. Results

The results of this study could provide significant insight into how teachers and school principals integrate technology into the educational environment. By analysing the answers to the questionnaire, a deeper understanding of the types of digital materials preferred, the frequency of their use and the professional training needs in this area can be gained. Thus, the study can contribute to the future development of continuous training strategies and educational policies to support a more effective and beneficial integration of technology in the learning and teaching process.

The recent study on the use of technology in the education system has provided significant insight into how educators and teachers approach modern teaching and learning methods. The results of this study revealed that the majority of participants (93.7%) are educators or teachers, which underlines the commitment of the educational community to exploring and implementing technological innovations in the educational process.

Among the findings, a significant proportion (94.9%) of participants were found to integrate digital tools and digital lessons in their teaching, learning and assessment activities. This approach indicates an increased concern for adopting didactic strategies based on modern digital technologies, aiming to stimulate students' interest and involvement in lessons.

Regarding preferred technologies for classroom use, students indicated that using computers/laptops was the most prevalent (55.7%). They also mentioned using bright tables and tablets with apps (12.7%), and a small percentage opted for smartphones (11.4%). Less commonly used technologies included 3D online interactive software (1.3%). Our study on integrating technology in education highlights the commitment of teachers to adopting technological innovations. About 94.9% of respondents use digital tools in their teaching activities, highlighting an increased interest in technology-based strategies. The majority preference for computers/laptops (55.7%) and other devices underlines the diversity of tools used.

However, there are challenges related to the availability and relevance of digital educational materials. While 62% believe that a wide range of resources are available, 34.2% believe that they do not always fit the school context. Thus, despite the progress made, a careful approach is needed to ensure an effective integration of technology in the learning and teaching process, supported by continuous training and well-founded educational strategies.

5. Conclusions

Overall, these findings highlight the positive shift towards technology integration in the Romanian education system. It is evident that digital tools and resources have become integral components of the teaching and learning process. The prevalence of digital materials and the wide variety of technologies used in the classroom signify a commitment to creating dynamic and engaging learning environments.

One of the notable aspects of this study is the focus on professional development. The survey examined participants' engagement in training programs aimed at enhancing their digital skills and their confidence levels in self-directed learning within a technological context. This dual approach not only assesses the practical application of technology but also the preparedness of educators to adapt to a rapidly

evolving digital landscape. Such insights are crucial as they can inform future strategies for professional development and educational policy.

The study's findings hold valuable implications for the future of education in Romania and beyond. They emphasize the importance of ongoing training for educators, which is essential for ensuring that teachers remain well-equipped to harness the full potential of digital tools. Furthermore, the strong integration of digital materials into teaching practices reflects a commitment to providing students with a well-rounded, modern education that aligns with the demands of the 21st century.

In conclusion, the study underscores the ongoing transformation of education in response to the digital age. It provides evidence that Romanian educators are actively embracing technology and adapting their teaching methods to create more interactive and effective learning experiences. As the education landscape continues to evolve, this research serves as a valuable resource for shaping policies and strategies that will enhance the integration of technology in education and ultimately benefit both educators and students.

Acknowledgments

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References

Freire, P. (1970). *Pedagogy of the oppressed*. Continuum.

Garrison, D. R., & Kanuka, H. (2021*). Blended learning: Uncovering its transformative potential in higher education*. Internet and Higher Education, 25, 1-2.

Muntean, L. (2017). *Resursele digitale în educaţia muzicală a şcolarilor mici. Tehnologii informatice şi de comunicaţii în domeniul muzical*, *8*(2), 21-27.

Muntean, L., Vesa, A., Barth, K., & Florescu, C. M. (2021). *Gaming and assessment in higher education*. *CIVAE 2021*, *2021*(3rd), 530.

Pascariu, C. C. (2017). *The movie–teaching material. The impact of video teaching methods on students.* The role of intercultural communication in adapting ethnic groups to the European Union social space, 289-296.

Piaget, J. (1972). *The psychology of the child*. Basic Books.

Rheingold, H. (2019). *Net smart: How to thrive online*. Mit Press.

Siemens, G. (2004). *Connectivism: A learning theory for the digital age. International Journal of Instructional Technology and Distance Learning*, 2(1), 3-10.

Smith, F. (2018). *The evolving classroom: How technology is changing the way we teach and learn.* EdTech Magazine.

Tomlinson, C. A. (1999). *The differentiated classroom: Responding to the needs of all learners*. ASCD.

Feedback on Students' Performance: Possible Ways of Enhancing Students' Success with Formative Assessment

Delia Muste, Tamari Ivanidze

Feedback on Students' Performance: Possible Ways of Enhancing Students' Success with Formative Assessment

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Abstract	Feedback has become as the main performance metric that's why meaningful and thoughtful feedback is important for improving students' learning path. It is provided by teachers to close the students' knowledge gap. Positive outcomes are determined by informative, goal-oriented and friendly delivered feedback. However, students and teachers lack knowledge about the role of feedback and its contribution in learners' progress. This article delves the significance of feedback on students' performance and its role for students' enhanced learning. The paper presents different types of formative feedback and their effectiveness for students' performance improvement. It also shows how effective feedback works in the classroom and strategic choices for feedback implementation. Feedback is presented as an essential tool for improving quality of teaching and education in general.
Keywords: effective feedback; assessment; enhanced performance.	

Zusammenfasung	Feedback ist zum wichtigsten Leistungsmaßstab geworden, weshalb aussagekräftiges und durchdachtes Feedback wichtig ist, um den Lernweg der Schüler zu verbessern. Es wird von Lehrern bereitgestellt, um die Wissenslücke der Schüler zu schließen. Positive Ergebnisse werden durch informatives, zielorientiertes und freundliches Feedback bestimmt. Allerdings mangelt es Schülern und Lehrern an Wissen über die Rolle von Feedback und seinen Beitrag zum Fortschritt der Lernenden. In diesem Artikel wird die Bedeutung des Feedbacks zur Leistung der Schüler und seine Rolle für die Verbesserung des Lernens der Schüler erläutert. Das Papier stellt verschiedene Arten von formativem Feedback und ihre Wirksamkeit für die Leistungsverbesserung der Schüler vor. Es zeigt auch, wie effektives Feedback im Klassenzimmer funktioniert und strategische Entscheidungen für die Feedback-Umsetzung. Feedback wird als wesentliches Instrument zur Verbesserung der Qualität des Unterrichts und der Bildung im Allgemeinen dargestellt.
Schlüsselworte: Effektives Feedback; Bewertung; verbesserte Leistung.	

1. Introduction

Effective feedback is one of the most essential strategies for learning and teaching, however, few studies have focused on students' awareness of feedback (Poulos & Mahony, 2008). Unfortunately, students do not regularly engage with feedback and understand its value. Taking into account the significant role that feedback plays in fostering learning, it is crucial to choose feedback options that students are likely to interact with. Due to the fact that every student has a particular preference, it is recommended that lecturers use a variety of feedback methods (Glazzard & Stones, 2019).

2. Theoretical foundation

Feedback is viewed as information about how you are doing in your efforts to achieve the concrete a goal (Wiggins, 2012). It should be emphasized that feedback is recognized as a key contributor to students' learning and the ability to provide feedback that is relevant to the pupils' level of knowledge is the teachers' most critical task. Delivering such feedback is a distinct Didactic act that promotes learning and development (Svanes & Skagen, 2017). Feedback is an important part of the formative assessment process. Formative assessment provides information to teachers and learners about how learners are progressing to the classroom goal. Providing good feedback is one of the important skills that teachers need to master good formative assessment. Formative learning cycle help students to experience three main assessment questions: Where I am going? Where I am now? How do I close the gap? (this last one means what should be done in the future). The most effective learning process means when students are able to compare their current knowledge to the goal and take actions to fill the gap. This is what formative assessment covers (Moss & Brookhart, 2012).

High-quality feedback has to disclose information about tasks or learning processes that bridge the gap

between what is understood and what is intended to be understood (Sadler, 1989). In higher education, feedback to undergraduate students is an issue that is on the agenda of many stakeholders. (Yang & Carless, 2013). The research of Hepplestone and Chikwa (2014) showed that students understood the aim of feedback as being the ability to refine their assignments and grades and their understanding of the subject.

As Ramsden (2003) claims that timely feedback is much more useful for students than delayed comments. In this situation the solution to avoid delayed response might be to look for common misunderstandings in the assignments and to list the mistakes with brief explanations and recommended further reading. The mistakes can be easily identified by numbering them on the students' work. In this case specificity of the comment to the topic or issue is very important and general comments like "Figure not necessary", "lacking continuity" are completely useless. Multiple-choice tests give another great opportunity to provide feedback in a useful way. While students do multiple-choice questions they aren't aware of which questions they have gotten wrong, why they are incorrect, or what the correct answers are. The lecturer can give marks to the students according to the number of the right answers and provide with the brief comments of the basis for the correct answer.

It is a serious challenge for many students to know how to use the feedback for the improvement of their work. However, providing students with feedback focusing only on the mistakes without further assistance will not help students to enhance their performance. That's why giving advice on how to enhance work can help students to find out the desired level that they are achieving or what is needed to gain the higher grade for the next evaluation (Glazzard & Stones, 2019). Awareness of students of the detailed assessment criteria is essential for them to successfully engage with feedback (Duncan, 2007).

When discussing feedback, it is crucial to examine two fundamental components: the transmitter and the receiver. The person who delivers feedback must comply with the certain requirements: considering the context, feedback must be determined correctly and used at the appropriate time in order to achieve the desired results. However, these conditions are not enough if the receiver is not trained to use the feedback in an adequate way. The effective feedback appears when the receiver understands, accepts and acts

according to it. Eventually, the receiver achieves desired goals (Muste, 2020).

2.1. Type of Feedback: Student Preferences for Type of feedback

The professors should use a variety of feedback techniques, such as verbal, written, audio, and video feedback. Feedback is generally presented in a written format and students find it beneficial, especially when it is well structured (Hepplestone & Chikwa, 2014; Glazzard & Stones, 2019). The written feedback is considered as most useful, when it is typed, easy to read, and is presented in relation of the learners' original work (Hepplestone & Chikwa, 2014). It also has been revealed that students prefer to receive the feedback individually from their teachers.

However, the dialogue and face to face discussion about the feedback is very important for students to clarify confusions promptly. Dialogic feedback works as a facilitator of self-regulated learning. It can flexibly adjust students' needs and help them to foster relationships (Yang & Carless, 2013). Dialogic feedback have been described as discussions among teachers and students regarding student work. It help everyone to understand the value of feedback and enhance the shared about it. All these lead students to future academic growth (Blair & McGinty, 2013). The students state that they generally prefer verbal feedback because it is more personal (Glazard & Stones, 2019).

Students claim that peer feedback is more apparent and beneficial than feedback provided by lecturers' (Falchikov, 2005). Peer feedback often follows an indirect methodology: students provide feedback on the fundamental aspects such as strengths and weaknesses of their peers' work. Furthermore, students have claimed that reviewing their classmates' work stimulates them to improve the self-reflective skills. This process enables them to use the criticism they provide for peers to revise their own opinions and judgements. (Nicol et al., 2014). One of the criteria on a rubric for class presentations should be how clear and understandable the presentation was to the audience. The class has the perfect opportunity to provide feedback on that aspect of a presentation (Brookhart, 2017).

2.2. The Effective Feedback

Effective feedback occurs when a person has a goal, takes action to achieve the target goal and receives information about his/her actions. All the productive feedback system includes both a precise

goal and tangible outcomes that are directly tied to the goal (Wiggins, 2012). The effective feedback need special conditions for successful implementation. It can be considered as effective if learners and teachers understand its value and learners are actively involved in feedback process because it is the process in which students make sense of information about their accomplishment and use it to improve the quality of their work or change learning strategies (Henderson et al., 2019).

Wiliam (2012) claims that:

▪ Feedback is effective when teachers present the classroom to students as a safe environment for making mistake.

▪ Teachers who provide feedback in a effective way express the following idea: smart is something you can become, not something you are. In this case, the most important supportive word that teachers use is "yet." When a learner says "I can't do this", the teacher adds, "yet."

▪ It should be emphasized that some students might need more assistance than others but all students can succeed.

Table 1. Feedback analysis guide (Brookhart, 2017, p.5)

Evaluate the feedback	What evidence does the feedback provide ?
Is it timey and descriptive?	What did the learners study from it?
Does it have a sufficient quantity of information?	
Does it focus on the work?	
Is it positive?	
Is it clear to the learner?	What did the teachers study from it?
It is detailed?	

The table clearly presents how the excellent feedback should be evaluated and the evidence of learning that is provided by feedback. We see the benefit of feedback by showing this table. Writing comments is more effective for learning than grading the students.

2.3. Feedback strategies

While providing the feedback teacher have to take into consideration the context: students characteristics, specificity of task and the classroom atmosphere. There is no one panacea that will always be the best option for all students. The immediate feedback always help students to change their actions and implement the teachers' suggestions (Brookhart, 2017).

Table 2. Feedback strategies, (Brookhart, 2017, p.13)

Feedback Strategies can vary in	In These Ways	Recommendations
Timing	*When give How often*	Give prompt feedback for to identify right/ wrong. Provide feedback as often as possible for all key assignments.
Amount	*How many points made*	Prioritize the most important points. Focus on the learners development level.
Type	*Dialogic Written*	Select the best type for the feedback. Interactive feedback works effectively. Use visual feedback if student needs an example.
Audience	*Individual Group*	Individual feedback conveys the message, "the teacher cares about my studies".

The table shows the strategic choices for feedback and suggests recommendations for each of them based on the research. There is no magic bullet that can work in every situation and can be relevant for all students. When the teacher chooses the feedback strategy she/he has to think about what should be delivered to the student. As Yang and Carless (2013) claim, introducing students to the various functions of feedback and their active engagement in producing, processing, and using feedback can help students develop self-regulation.

Also, feedback interventions are easy to implement, but they also require careful management of the activities, which is mostly the responsibility of the teacher. When feedback is given to the student immediately after he shows evidence of learning, he responds positively and associates the learning experience with a constructive attitude. If the teacher takes too long to give feedback, the intent is lost and the student may not connect the feedback to the action taken, the behavior displayed, or the goal achieved.

3. Conclusions

This paper explored the function of effective feedback and types of feedback. It also studied the most useful modes of feedback such as written and peer feedback. The studies showed that dialogic feedback is more effective than other type of feedback since it includes discussion between the student and teacher, they both define what should be improved and design the strategies for achieving the goal. This paper can be used as a theoretical framework of feedback in general. It also revealed the importance of students' awareness about feedback and its role in enhancement of learners' academic achievements. The timely feedback has been found out as important part of the feedback itself. The paper studied the strategies that should be taken into consideration while teachers provide feedback since it helps them to give precise recommendations to students

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References

Blair, A. A., & McGinty, S. (2013). Feedback-dialogues: exploring the student perspective. *Assessment & Evaluation in Higher Education, 38*(4), 466-476. https://doi.org/10.1080/02602938.2011.649244

Brookhart, S. M. (2017). How to give effective feedback to your students. ASCD. Duncan, N. (2007). 'Feed-forward': improving students' use of tutors' comments. *Assessment & Evaluation in Higher Education, 32*(3), 271-283.

Falchikov, N. (2005). *Improving Assessment through Student Involvement*. London: Routledge-Falmer

Glazzard, J., & Stones, S. (2019). Student perceptions of feedback in higher education. *International Journal of Learning, Teaching and Educational Research, 18*(11), 38-52.

Hepplestone, S., & Chikwa, G. (2014). Understanding how students process and use feedback to support their learning. *Practitioner Research in Higher Education, 8*(1), 41-53.

Henderson, M., Phillips, M., Ryan, T., Boud, D., Dawson, P., Molloy, E., & Mahoney, P. (2019). Conditions that enable effective feedback. *Higher Education Research & Development, 38*(7), 1401-1416.

Moss, C. M., & Brookhart, S. M. (2012). *Learning targets: Helping students aim for understanding in today's lesson*. ASCD.

Muste, D. (2020). The role of feedback in the teaching-learning process. *Educatia 21*, (19), 137–142. https://doi.org/10.24193/ed21.2020.19.17

Nicol, D. (2010). "From Monologue to Dialogue: Improving Written Feedback in Mass Higher Education". *Assessment & Evaluation in Higher Education, 35*(5), 501-517. https://doi.org/10.1080/0260293100378655.

Poulos, A., & Mahony, M. J. (2008). Effectiveness of feedback: The students' perspective. *Assessment & Evaluation in Higher Education, 33*(2), 143-154.

Ramsden, P. (2003). Learning to teach in higher education. Routledge.

Svanes, I. K., & Skagen, K. (2017). Connecting feedback, classroom research and Didaktik perspectives. *Journal of Curriculum Studies, 49*(3), 334-351.

Sadler, D. R. (1989). Formative assessment and the design of instructional systems. *Instructional science, 18*(2), 119-144.

Wiliam, D. (2012). Feedback: Part of a system. *Educational Leadership, 70*(1), 30-34.

Wiggins, G. (2012). Seven keys to effective feedback. *Feedback, 70*(1), 10-16.

Yang, M., & Carless, D. (2013). The feedback triangle and the enhancement of dialogic feedback processes. *Teaching in Higher Education, 18*(3), 285-297.

Efficient Strategies to Develop the Cultural Competence of Our Pupils. Recommendations for a High-Quality Management of Educational Activities

Diana-Crina Marin, Mușata Bocoș

Efficient Strategies to Develop the Cultural Competence of Our Pupils. Recommendations for a High-Quality Management of Educational Activities

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Abstract	
Keywords: extracurricular activities; eTwinning projects; Erasmus+ projects; cultural competence; intercultural competence.	In this study, some effective recommendations were established through which pupils' cultural competence can be developed. We started from the premise that developing pupils' ability to live with others facilitates the accelerated development of pupils' cultural competence. Therefore, interviews with school principals and online surveys were conducted for parents and teachers to make useful recommendations for teachers and school leaders. From the perspective of the management of educational activities, it is very important to strengthen the relations between the school and the members of the community. Also, the Erasmus+ and eTwinning projects play an extremely important role in the development of pupils' cultural competence. The study revealed the impact and benefits of establishing active partnerships between educational institutions and members of the local or international community. It is also recommended to develop educational projects through which pupils can come into contact with community members to better understand the historical past and cultural heritage of their country. The study is useful for school leaders and teachers interested in developing pupils' cultural competence.

Zusammenfasung	
Schlüsselworte: außerschulische Aktivitäten; eTwinning-Projekte; Erasmus+-Projekte; kulturelle Kompetenz; interkulturelle Kompetenz.	In dieser Studie wurden einige wirksame Empfehlungen für die Entwicklung der kulturellen Kompetenz von Schülern erarbeitet. Wir sind davon ausgegangen, dass die Entwicklung der Fähigkeit der Schüler, mit anderen zusammenzuleben, die beschleunigte Entwicklung der kulturellen Kompetenz der Schüler erleichtert. Daher wurden Interviews mit Schulleitern und Online-Umfragen bei Eltern und Lehrern durchgeführt, um Lehrern und Schulleitern nützliche Empfehlungen zu geben. Aus Sicht des Bildungsmanagements ist es sehr wichtig, die Beziehungen zwischen der Schule und den Mitgliedern der Gemeinschaft zu stärken. Erasmus+- und eTwinning-Projekte spielen auch eine äußerst wichtige Rolle bei der Entwicklung der kulturellen Kompetenz der Schüler. Die Studie hat gezeigt, welche Auswirkungen und Vorteile der Aufbau aktiver Partnerschaften zwischen Bildungseinrichtungen und Mitgliedern der lokalen oder internationalen Gemeinschaft hat. Es wird auch empfohlen, Bildungsprojekte zu entwickeln, durch die Schüler mit Mitgliedern der Gemeinschaft in Kontakt kommen können, um die historische Vergangenheit und das kulturelle Erbe ihres Landes besser zu verstehen. Die Studie ist nützlich für Schulleiter und Lehrer, die an der Entwicklung der kulturellen Kompetenz ihrer Schüler interessiert sind.

1. Introduction

In the European Union, policies in the field of culture have been developed to help protect Europe's cultural heritage and promote shared values through cooperation between cultural institutions in different countries. Actions taken by educational institutions to develop pupils' cultural competence are in line with legislative documents drawn up at the European level and promote appreciation and respect for Europe's cultural heritage, for cultural and linguistic diversity. Educational institutions offer pupils the opportunity to develop their cultural competence and cooperation skills. The subjects included in the "Man and Society" curriculum area are also an important means by which knowledge about the culture and history of the European peoples can be transmitted, through which the diversity of European culture can be promoted and through which a sense of belonging to the European Union can be developed. The study of foreign languages also helps pupils to initiate intercultural dialogues. Such approaches help pupils to understand the significance of Europe's cultural heritage and to become active citizens capable of taking steps to ensure social well-being. Schools are also a space for developing pupils' creativity. Schools' collaborative projects also facilitate pupils' involvement in intercultural dialogues.

2. Theoretical foundation

Culture is the totality of values, customs of life, and traditions of a people, which are transmitted from

generation to generation. Cultural competence is an integrated system of knowledge, skills, and attitudes formed in formal, non-formal, and informal educational contexts, necessary to accept cultural diversity and to understand the specificity of one's own culture (Chelcea & Iluț, 2003). Intercultural competence is an integrated system of knowledge, skills, and positive attitudes that ensures effective communication with representatives of other cultures. Some specialists consider that between the two concepts, there is an equivalence relationship. Our teaching approaches are associated with the educational paradigm, in which the pupil is placed at the center educational process. From the present curricular perspective, both emotional and cognitive development are important. "Learn to live together" is the fourth pillar of education (Delors, 1996). School contexts are the main means through which cultural competence can be developed, but family and community members also play an important role in shaping cultural competence. For the development of cultural competence, the disciplines included in curricular areas such as "Language and Communication", "Man and Society", "Counselling and Guidance", "Arts" and "Technologies", the extracurricular activities, and some of the disciplines included in the curriculum at the school's decision play an important role. Cultural-artistic activities (literature, theatre, visual arts, dance, music, folklore, traditions, and customs) contribute significantly to the development of cultural competence. Cultural and artistic activities, as well as didactic activities specific to the subjects in the "Language and Communication" and "Arts" curricular areas, contribute significantly to the development of cultural awareness and artistic expression. From the perspective of the management of educational activities, it is recommended to organize activities that allow the development of pupils' creativity, the expression of ideas, and pupils' experiences through different forms: among which we mention: music, performing arts, literature, and visual arts. Cultural-artistic activities are a favorable opportunity for cultural-artistic education and the development of pupils' creativity. The study "How to Become a Memorable Teacher for Your Pupils?" (Marin et al., 2022) outlines the importance of interactive instruction, the presence of the members of the communities in the school space and the cooperation between more classes of pupils, during the didactic activities.

"Working and living in a global society requires the ability to create interactions and relationships with people who are different from oneself. It is critical to know how to assess our cultural competency and evaluate our own cultural behaviors" (Rustamova, 2022, p. 6). Intercultural competence refers to intellectual and practical abilities very necessary for the citizens of the future (Deardorff, 2006; Eisenchlas & Trevaskes, 2007; Hammer et al., 2003). Educational activities that contribute significantly to the development of cultural competence are based on effective communication between persons from many cultures (Rustamova, 2022). Promotion of diversity in school space is an effective practice with effective benefits on pupils' development (Neves et al., 2023). Also, experiential learning is associated with positive life experiences and effective development (Jackson, 2011). International projects provide pupils with excellent opportunities to develop their cultural competence (Wolff & Borzikowsky, 2018).

3. Research methodology

We have used a nonexperimental design in order the establish the answer to the following questions:

- Which school activities contribute significantly to the development of cultural competence?
- What recommendations can be made from an educational management perspective to facilitate the effective development of cultural competence?

The interview was the method used for collecting data from 30 specialists from the educational field (school principals and coordinators of educational projects and programs). Each of the specialists involved in our research has answered the following questions:

- What should be the main abilities, attitudes, and knowledge of the absolvents, with a high level of development of cultural competence?
- What educational activities could be organized to efficiently develop the cultural competence of the pupils?

We have also administered the questionnaires included in Appendix 1 and Appendix 2 to establish which are the school activities that pupils and teachers desire to be initiated in the future. The sample of participants was composed of 44 primary school pupils, 64 gymnasium pupils, 108 high school pupils, and 222 parents.

4. Results

The interview revealed that pupils with a high level of development of cultural competency have

abilities, attitudes, and knowledge as the ones included in Table 1.

Table 1. Abilities, attitudes, and knowledge associated with the fourth pillar of education (Learn to live together)

Attitudes	Abilities	Knowledge
Civic spirit	Ability to empathize	Knowledge of national cultural specificities
Responsibility	Ability to cooperate	
Respect		
Tolerance and acceptance	Ability to manage conflicts	Knowledge of cultural diversity
Compassion	Active listening skills	Knowledge about oneself
Empathy		
Gratitude	Flexibility and adaptability	
Dignity		
Honesty	Assertive communication skills	
Solidarity		
	Creative skills	
	Planning skills	
	Digital skills	
	Language skills	

All of the persons who have participated in our study agreed that developing the empathy of the pupils and their sense of belonging to a particular culture are the main actions needed to develop children's competencies needed to live in harmony with others.

Figure 1. Actions needed to form competencies related to the fourth pillar of education (Learn to live together)

Based on the answers provided by the school leaders involved in our research, we have built a model of the progressive development of cultural competence, presented in Figure 2.

The model presented in Figure 3, outlines that intercultural communication competencies are touching at the highest level of development when there is openness to intercultural dialogue. Communion is the result of building strong and united communities. Valuing this perspective, the didactic activities should be organized with the purpose to facilitate the understanding of personal identity, to understand the specifics of their local community, and to increase the sense of belonging to a community.

Figure 2. Progressive development of cultural competence

Figure 3. Communion, the result of an effective intercultural dialogue
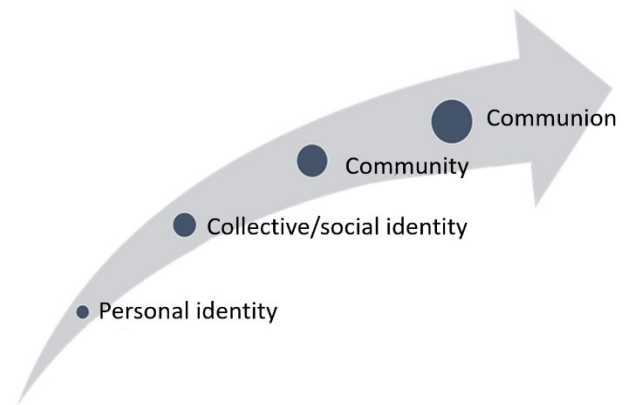
Our research revealed that are necessary the following didactic approaches, in order to form and develop the cultural competence of our pupils:

▪ Educational activities through which pupils learn about their traditions, history, and spiritual values;

▪ Activities through which pupils develop empathy and interpersonal skills;

▪ Activities in which pupils interact frequently with members of the community;

▪ Activities that promote European cultural values;

▪ Activities through which pupils understand differences and similarities between people;

▪ Experiential learning activities;

▪ Activities included in international projects (for example eTwinning and Eramsus+ projects).

The questionnaires included in Appendix 1 and Appendix 2 were administered to establish the preferences of the pupils regarding the persons that could be invited into the school space and regarding the topic of the activities. Some of the pupils enrolled in the primary and at the gymnasium level mentioned that they enjoy the activities based on the presence of their parents, as guests. Also, most of the high school pupils mentioned they want to know people who had success in life and to learn from their life experiences.

Table 2. Members of the community who could be invited to the educational activities organized in schools

Category of respondents	Category of guests that could be invited to school
Primary school pupils	Police officers, visual artists, military personnel, performance athletes, choreographers, car mechanics, performers, lawyers, psychologists, programmers, magicians, volunteers, priests, mayors, doctors, beekeepers
Gymnasium pupils	Sportsmen and women, veterinarians, first aiders, doctors, mayors, NGO representatives, actors, singers, policemen, writers, entrepreneurs, firemen, experts in various fields, retired teachers, mountaineers, military personnel.
Highschool pupils	University professors, people working at the anti-drug center, contemporary artists or writers, doctors, successful school graduates, nutritionists, fitness instructors, entrepreneurs, judges or lawyers, representatives of environmental NGOs, actors, athletes, psychologists, IT and architecture/design specialists, policemen, education/positive influencers, mayors, singers, entrepreneurs, writers, students, volunteers from various NGOs
Parents	Researchers, coaches, priests

Based on the data collected using the questionnaires included in Appendix 1 and Appendix 2, we have established, that the most attractive activities for all the categories of ages of the pupils are excursions (see Table 3). Other activities mentioned by pupils enrolled at the gymnasium level are risk behaviors prevention activities, legal education activities, and cooking workshops. Also, the high school pupils mentioned that would like to be organized risk behaviors prevention activities, visits to economic agents or institutions nearby, anti-drug activities, art workshops, and programming activities.

Table 3. The ranking of the activities preferred by pupils, considering their age level

The position in the ranking of activities desired by pupils	Primary school level	Gymnasium level	High school level
First place	Excursions	Excursions	Excursions
Second place	School celebrations	Sport activities	Vocational counseling activities
Third place	Environmental protection activities	Environmental protection activities	School celebrations
Fourth place	Sport activities	Financial education activities	Financial education activities
Fifth place	Activities to learn how to live a healthy lifestyle	School celebrations	Volunteering
Sixth place	Road safety education activities	Health education activities	Legal education activities
Seventh place	Activities to help the elderly or children from low-income families	Road safety education activities	Health education activities
Eighth place	Pottery activities	Visits to economic agents or institutions nearby	Environmental protection activities
Ninth place	Volunteering	Volunteering	Road safety education activities

5. Discussions

To develop the cultural competence of our pupils, it is recommended to initiate teaching approaches focused on: intellectual development, personal development, and the development of their socio-relational skills. The results of the study are useful for school leaders and teachers. Based on the results obtained we can affirm that educational activities that can accelerate the process of developing the cultural competence of the children are based on systematic interactions with other persons and are organized in various educational contexts. The main limitation of

the study is related to the number of participants. The list of good practices and recommendations could become larger if many participants had been involved in our research.

6. Conclusions

Based on the results obtained, we can formulate the following recommendations for school principals and teachers:

▪ is necessary to be initiated actions to strengthen the system of relationships between individuals, groups of individuals, institutional structures, institutions, or organizations, by setting common goals, increasing involvement, mutual motivation and support, collaboration, and assuming mutual responsibilities;

▪ it is beneficial to include in the calendar of school educational activities very diverse programs, projects or activities, to ensure cooperation between the different areas: social, cultural, artistic, religious, etc.;

▪ organizing interdisciplinary and transdisciplinary teaching activities by making the most of team teaching and ensuring the interdisciplinary coherence of the curriculum;

▪ valuing the necessity of developing children's socio-relational competencies, needed in order to live in harmony with others.

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References

Chelcea, S., & Iluț, P. (coord.) (2003), *Enciclopedie de psihosociologie*, Editura Economică, București.

Deardorff, D. (2006). Identification and assessment of intercultural competence as a student outcome of internationalization. *Journal of Studies in International Education,* *10*(3), 241–266. https://journals.sagepub.com/doi/10.1177/1028315306287002

Delors, J. (1996). *Learning: the treasure within: report to UNESCO of the International Commission on Education for the Twenty-first Century.* Paris: Unesco Publishing. Available at: https://unesdoc.unesco.org/ark:/48223/pf0000109590

Eisenchlas, S., & Trevaskes, S. (2007). Developing intercultural communication skills through intergroup interaction. *Intercultural Education, 18*(5), 413–425. https://doi.org/10.1080/14675980701685271.

Hammer, M. R., Bennett, M. J., & Wiseman, R. (2003). Measuring intercultural sensitivity: The intercultural development inventory. *International Journal of Intercultural Relations, 27*, 421–443. https://doi.org/10.1016/S0147-1767(03)00032-4.

Jackson, J. (2011). Cultivating cosmopolitan, intercultural citizenship through critical reflection and international, experiential learning. *Language and Intercultural Communication*, *11*(2), 80–96. https://doi.org/10.1080/14708477.2011.556737

Marin, D.-C., Bocoș, M. & Baciu C. (2022). How to Become a Memorable Teacher for Your Pupils?. *Educatia 21 Journal, 22,* 66-71. http://dx.doi.org/10.24193/ed21.2022.22.07

Neves, C., Almeida, A.P., & Ferreira, M. (2023). Headteachers and inclusion: setting the tone for an inclusive school. *Education Sciences, 13(2*), 129. https://doi.org/10.3390/educsci13020129

Rustamova, N. R. (2022). Development of Socio-Cultural Competence. *Indonesian Journal of Innovation Studies, 18*, 5-9. https://doi.org/10.21070/ijins.v18i.651

Wolff, F., & Borzikowsky, C. (2018). Intercultural Competence by international experiences? An investigation of the impact of educational stays abroad on intercultural competence and its facets. *Journal of Cross-Cultural Psychology*, *49*(3), 488–514. https://doi.org/10.1177/0022022118754721.

Appendixes

Appendix 1
Questionnaire for pupils
Please complete this questionnaire to help us organize educational activities that you will enjoy participating in.

1. Choose one or two areas in which you have achieved outstanding results and in which you feel you are talented. (several answers possible)

☐ Artistic

☐ Sports

☐ Literature

☐ Scientific

☐ Mathematical

☐ Music

☐ Dance

☐ Other fields such as: [＿＿＿＿＿＿]

2. List one or two of your successes so far that you would like your teachers to know about. If you wish, include your full name.
_____
_____

3. eTwinning projects are activities in which pupils from several countries take part in joint activities. Mention the title or theme of a project you would like to be actively involved in.
_____
_____

4. What activities would you like to participate in? (several possible answers)

☐ Financial education activities

☐ Volunteering

☐ School celebrations

☐ Excursions

☐ Activities to learn how to live a healthy lifestyle

☐ Sport activities

☐ Environmental protection activities

☐ Road safety activities

☐ Vocational counseling activities

☐ Other activities such as: [＿＿＿＿＿＿]

5. Would you like your most important achievements to be promoted on the school's Facebook page as part of a campaign to promote successful pupils?

☐ Yes

☐ No

6. Suggest an activity that could take place after school that you think you and your classmates would enjoy participating in.
_____
_____

7. Would you like to know how smart you are and what your most developed skills are?

☐ Yes

☐
No

☐
Don't know

8. Suggest a guest who you would like to participate in educational activities at school.
_____
_____

9. Suggest other activities you would like to participate in this school year with your classmates.
_____
_____

Appendix 2
Questionnaire for parents

Through this questionnaire, we aim to investigate your opinion about the extracurricular activities you would like to see organized by our teachers in the school year 2022-2023.

1. Please suggest some extracurricular activities that you think would meet your child's interests: (several answers possible)

☐
School celebrations

☐
Excursions

☐
Visits

☐
Sport activities

☐
Environmental protection activities

☐
Road safety education activities

☐
Health education activities

☐
Risk behaviors prevention activities

☐
Financial education activities

☐
Legal education activities

☐
Science activities

☐
Volunteering

☐
Vocational counseling activities

☐
Other activities such as: [_____]

2. Would you like to be invited as a guest to school activities? If yes, please write your full name and phone number in the field below and indicate what you would be able to talk to pupils about.
_____
_____

3. Please mention the names of people from our community who would be worth participating as guests in the extracurricular activities organized by our school.
_____
_____

4. Give, if appropriate, other examples of activities that could be organized and that meet your child's interests and age (e.g. activities to identify children's abilities, about professions, or career guidance).
_____
_____

5. In which class is your child enrolled?
_____
_____

Kindergarten Teachers' Perceptions of Ecological Education Programs in Preschoolers – A Focus Group Approach

Andreea A. Marin, Alina S. Rusu

Kindergarten Teachers' Perceptions of Ecological Education Programs in Preschoolers – A Focus Group Approach

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Abstract	
Keywords: ecological education; kindergarten teachers; qualitative study; reflections.	The purpose of ecological education (EE), in addition to promoting understanding of environmental issues and the motivation to deal with them, is to ensure that preschoolers understand that humans are part of the biosphere and that they have the ability to impact its functionality in various levels. Kindergarten teachers are important agents of change in terms of creating opportunities for children to experience and internalise values based on ecological education. The objective of this study is to investigate teachers' perceptions of the EE programs in preschoolers, i.e. activities focusing on the direction of developing environmentally friendly behaviors and attitudes in children. Focus group methodological approach was used in order to collect the reflections of five kindergarten teachers in Romania. The focus group was guided by specific questions. Group members were convened online, being informed that the entire meeting would be recorded and that the data would be confidential and used strictly for research purposes Following the thematic qualitative analysis of the transcript, the idenitified themes indicate that teachers expressed openness and readiness to implement ecological educational activities in their own classes with the aim of fostering a friendly behavior of children with the environment.

Zusammenfasung	
Schlüsselworte: ökologische bildung; kindergartenlehrer; qualitative studie; reflexionen.	Der Zweck der ökologischen Bildung (EE) besteht darin, neben der Förderung des Verständnisses für Umweltfragen und der Motivation, sich mit ihnen auseinanderzusetzen, sicherzustellen, dass Vorschulkinder verstehen, dass Menschen Teil der Biosphäre sind und dass sie die Fähigkeit haben, deren Funktionsweise auf verschiedenen Ebenen zu beeinflussen. Kindergartenlehrer sind wichtige Akteure des Wandels, wenn es darum geht, Möglichkeiten zu schaffen, damit Kinder Werte auf der Grundlage der ökologischen Bildung erleben und verinnerlichen können. Ziel dieser Studie ist es, die Wahrnehmungen der Lehrerinnen und Lehrer zu den EE-Programmen für Vorschulkinder zu untersuchen, d.h. Aktivitäten, die darauf abzielen, umweltfreundliches Verhalten und Einstellungen bei Kindern zu entwickeln. Die Fokusgruppenmethodik wurde verwendet, um die Reflexionen von fünf Kindergartenlehrern in Rumänien zu sammeln. Die Fokusgruppe wurde anhand spezifischer Fragen geleitet. Die Gruppenmitglieder wurden online einberufen und darüber informiert, dass das gesamte Treffen aufgezeichnet wird und die Daten vertraulich sind und ausschließlich für Forschungszwecke verwendet werden. Nach der thematischen qualitativen Analyse des Transkripts zeigen die identifizierten Themen, dass die Lehrerinnen und Lehrer sich offen und bereit zeigten, ökologische Bildungsaktivitäten in ihren eigenen Klassen umzusetzen, um ein umweltfreundliches Verhalten der Kinder zu fördern.

1. Introduction

The main goal of ecological education is the formation of attitudes and behaviours that lead to the protection of the environment. Starting from this premise, it is considered appropriate for ecological education to be offered as early as possible, i.e. from the preschool age, because this is the period when the cognitive, emotional and moral formation of the future responsible human beings starts (Ferreira et al., 2016).

The first interactions between the preschool children and nature should be as meaningful as possible and it should cause emotional experiences that foster the formation of a moral conscience towards the environment and to the development of environmentally friendly behavior. In order for this to happen, it is necessary for the ecological activities to be attractive and practical, adapted to the level of communication and understanding of preschoolers, and to take place as often as the preschool programs allow (Kahriman-Öztürk, 2010; Kahriman-Öztürk et al., 2012; Ahi & Balcı, 2017; Alıcı, 2013; Cengizoğlu, 2013; Evans et al., 2018; Ernst & Burcak, 2019; Melis et al., 2020).

Preschool teachers have the responsibility to design, organize and implement ecological activities in ways that arouse the enthusiasm of children and the desire to get involved in the problems that the environment is currently facing, as well as to try to find sustainable solutions to preserve the environment (Wilson, 2002).

2. Theoretical foundation

Recent literature reviews indicate that ecological education is recognized as very important in these current times, because humanity is facing numerous environmental problems (e.g. Marin & Rusu, 2023). Numerous researchers have come to the conclusion that ecological education must start from early ages, in which characters starts to form and attitudes develop in association with moral conscience (Broyles, 2011; Fereira et al., 2016; Evans et al., 2018; Ernst & Burcak, 2019; Melis et al., 2020;)

Kavaz et al. (2021) investigated the children's perceptions of the environment. The researchers used the 7R ecological model proposed by World Organisation for Early Childhood Education in 2011 (WOECE, 2011). Through this study, it was found that preschoolers are not familiar with all the dimensions of the 7R model, but rather with only two dimensions of the 7R model, namely the dimensions "reduce" and "respect".

Biber et al. (2021) conducted a descriptive study in which they examined the environmental awareness and behavior of 5-6-year-old children attending private nature-centered kindergartens and public kindergartens. Following the study, the researchers concluded that the awareness of the existence of the environment and the friendly behavior towards the environment of preschool children from private nature-centered kindergartens were significantly higher than that of preschoolers from public kindergartens.

Tümer and Temel (2021) conducted a descriptive study aiming to develop an environmental scale to measure the environmental awareness of preschoolers aged between 48-72 months. Gökçeli & Kandir (2015) carried out a qualitative study with the aim of testing the impact of an Environmental Education Program on preschool children aged between 48 - 66 months. The researchers concluded that the Environmental Education Program was effective and increased children's awareness of the environment. More then that, Gökçeli (2022) carried out a quasi-experimental study aiming to find out if language activities integrated with ecological education within the Environmental Education Program have a positive or negative impact on the awareness of both the environment and environmental problems in preschoolers aged between 4-6 years. The researcher concluded that there are differences between the experimental and control groups, thus indicating that the Environmental Education Program had a positive impact on the investigated variables.

Karakaya et al. (2022) performed a qualitative study that included activities for preschoolers to understand the existence of a group of living organism and activities to evaluate the newly formed knowledge about this group. The aim was that preschoolers in the age of 4-6 years old discover this different group of species (*Fung*i), as well as the role of this group of organisms in the composition of the environment.

Taking into account that the first experiences of children regarding education toward nature in general is lived in the family, Kroufek et al. (2016) conducted a qualitative study with the aim of describing the link between the attitudes and ecological behavior of preschool children and their parents. The conclusion developed at the end of the study was that there is a positive correlation between the parental level of education and their attitudes towards the environment and the children's attitudes towards the environment.

Both education in general and ecological education offered to preschoolers must be in continuous innovation and development, and teaching must be carried out using innovative and original methods that lead to the achievement of educational goals. Starting from this consideration, Kabadayi and Altinsoy (2018) conducted an experimental study with the aim of comparing traditional methods and technological methods to measure the degree of awareness and behavior of preschoolers towards the environment. They concluded that technological methods are more innovative and effective in terms of teaching concepts.

The need to include ecological education in kindergartens is also felt by kindergartens in the Romanian education system. Thus, the Ministry of Education decided in 2023 to introduce a program called "Green Week". This program runs over a period of 5 days where only ecological activities are taught. These activities carried out as part of the "Green Week" program aim to train children to be able to research, identify, make decisions and find solutions regarding the environmental problems that today's society faces.

The aim of this current study is to investigate in a qualitative manner the perceptions of preschool teachers in a Romanian kindergarten in relation to environmental education and the cultivation of environmentally friendly attitudes and behaviors in preschoolers. The focus group method represents a carefully constructed discussion with the aim of understanding the participants' perceptions of a topic and issuing hypotheses on that topic (Krueger & Casey, 2014). The method implies the creation of a group made up of 5-12 people, which is focused on a specific theme, being guided by specific questions (Carey, 1994). In the focus group, the discussion is led by a moderator, and the group, space and time being set beforehand. Group members are convened in a specially arranged space, or in an online context, being informed that the entire session will be recorded, the data being confidential and used strictly for research purposes (Krueger & Casey, 2014). The reflections of the participants are later on analysed by specific protocols in the area of qualitative thematic analysis.

3. Research methodology

3.1. Participants

The invitation to participate in the study was sent to 7 teachers from a public kindergarten in Timis county, Romania, where about 850 children between the ages of 3-6 attended the kindergarten in the 2022-2023 school year. All 7 teachers confirmed their participation, but due to personal reasons, i.e. lack of time, only 5 of the 7 teachers participated in the study (Table 1). All the participating teachers were women, with the age between 40 and 55 years old and with a experience in preschool teacher between 10 and 25 years. The teaching staff gave their informed consent to participate. They were informed about the data recording and the confidentiality of the data usage.

Table 1. The demographic information about the participants.

Nr.	The initials of the teacher's name	Gender	Seniority in education	Parent	The profession	Education level
1	B.L	F	25 years	Yes	Preschool teacher	Higher education
2	P.G	F	24 years	Yes	Preschool teacher	Higher education
3	L.S	F	25 years	Yes	Preschool teacher	Higher education
4	A.M	F	10 years	Yes	Preschool teacher	Higher education
5	J.A	F	22 years	Yes	Preschool teacher	Higher education

3.2. Procedure

The focus group took place online on the Google Meet platform. A pleasant and safe environment was created for the development of the discussion. There were no restrictions in terms of dialogue, as well as no right or wrong answers. The date, time and place of the focus group were communicated in advance to the study participants.

The duration of the focus group was 60 minutes, and for each teacher was allocated a time of 3-5 minutes for each answer to the question. The discussion was led by a moderator (A.M.). The answers from the focus group were recorded and transcribed verbatim by the authors. The data obtained were analyzed according to the method described by Erlingsson & Brysiewicz (2017), having the following three steps: transcribing the text, condensing the text by identifying meaningful units (codes), identifying the themes and the categories.

The questions in this focus group were:

▪ Have you implemented environmental education activities in the classroom? Please describe them.
▪ How did you feel when you implemented environmental education activities in the classroom?
▪ How do you think preschoolers perceived these environmental education activities?
▪ What do you think is necessary for ecological activities to be an adequate pedagogical and didactic resource to instill ecological behavior in preschoolers?
▪ What skills do you think preschoolers develop as a result of participating in environmental education activities in kindergarten?
▪ In what ways do you think parents and/or relatives of preschoolers could contribute to environmental education activities in kindergarten?
▪ In the future, would you like to participate in trainings for the implementation of environmental education activities in the group? How do you think these should go?

4. Results

The results are presented according to the research questions of the study.

1. Have you implemented environmental education activities in the classroom? Please describe them.

The collected data indicated that all the preschool teachers carried out various ecological activities aiming to instill in preschoolers love and care for the environment. More than that, they integrated

ecological activities with other types of educational activities, such as language education activities,

practical activities housekeeping or mathematical activities (table 2).

Table 2. Theme, codes and categories of the answers to the research question 1

Theme	Category	Codes	Informational units from the transcript
Have you implemented environmental education activities in the classroom?	Informational and engaging materials	Handouts Videos about recycling	"I implemented sheets with requirements about the ecological activity beneficial for the Earth, visits to the greenhouse with flowers, recycling activities with containers of different colors, collecting and recycling colored caps, watching an educational video about recycling and the importance of plants and animals in our lives" B.L.
		Ecomathematical games.	"I have made games from cardboard boxes, recyclable bins for the four categories - household waste, glass, plastic and papers, eco-mathematical games, games from 5-liter PET bottles" P.G.
	Gardening activities	Flower planting Taking care of the trees in the kindergarten yard Games and toys from recyclable materials	"I planted flowers with the children, I whitewashed the trees in the yard of the kindergarten, I participated with the children in contests with an ecological theme" L.S.
	Waste related activities		"We recycled batteries, we talked about how to recycle used batteries, we played ecological board games, we collected and we recycled the colored caps together with the children and made toys, paintings and little trains from the caps" L.S.
		Recycling bins Collecting waste from around the kindergarten,	"I went with the children to collect the waste around the kindergarten, I wrote the children's names on the plastic cups from which they drink water and I put the ones that we should have used separately. At the end of the week. I showed how much we managed to save and collected, recycled batteries, we discussed how we can recycle and help nature" A.M.
		Selective garbage collection	"I planted wheat, I used corks as stamps in the plastic activities, I brought two trash cans to the classroom, one yellow and one black, and since then, we have been collecting trash selectively". J.A.

2. How did you feel when you implemented environmental education activities in the classroom?

Table 3. Theme, codes and categories of the answers to the research question 2

Theme	Category	Codes	Informational Units from the transcript
How did you feel when you implemented environmental education activities in the classroom?	Positive affects	Happiness Satisfaction	"I felt happy"B.L. "I felt very good and I felt satisfaction from the results I had" L.S.
	Instrumental value	Usefulness Creativity	"I felt useful to the environment, useful to generations, useful to the planet" A.M. "I felt like a drop from the fountain of creativity" J.A.

Analyzing the obtained data, we noticed the fact that all the teachers carried out the ecological activities with great enthusiasm and reported positive emotions, managing to instill these feelings in the children, thus bringing them even closer to caring for the environment. Also, the teachers reported a strong feeling of usefulness and creativity while being involved in meaningful ecological activities with the children.

3. How do you think preschoolers perceived these environmental education activities?

Analyzing the answers of the teaching staff, we noticed that, according to the teachers, the preschoolers experienced positive attitudes towards the ecological activities carried out by the teaching staff, and they participated in the activities with enthusiasm, happiness, joy, amazement, delight, excitement, and pleasure (table 4).

Table 4. Theme, codes and categories of the answers to the research question 3

Theme	Category	Codes	Informational Units from the transcript
How do you think preschoolers perceived these environmental education activities?	Positive affects	Enthusiasm Happiness Joy Amazement Delight Excitement Pleasure	"On the part of the preschoolers, I felt enthusiasm and a lot of involvement from both the children and the parents" B.L. "I saw a happiness, a joy on the part of the children to get involved, to create by themselves certain sheets, games or even animals" P.G. "The children were very enthusiastic, they participated with great pleasure in every activity we did with them and with enthusiasm. I saw in the children the pleasure with which they carried out the activity itself. So, they like it and they felt very good" L.S.
	Motivation	Involvement Awareness	"The children in my group were amazed by the things they found out. They started to turn off the light bulbs when they saw that the sun was coming out, in the bathroom I could hear them discussing turning off the water because the fish will die if water is wasted. The children were very happy to do ecological activities" A.M. "I noticed that preschoolers are very excited about ecological activities" J.A.

4. What do you think is necessary for ecological activities to be an adequate pedagogical and didactic resource to instill ecological behavior in preschoolers?

Analyzing the answers of the teachers, we noticed that in order for the ecological activities to be an adequate pedagogical and didactic resource for instilling ecological behavior in preschoolers, it is necessary to design the activities to be oriented towards nature and to be designed according to the age level of the preschoolers. It is also necessary that the activities have a positive impact for preschoolers (table 5).

Table 5. Theme, codes and categories of the answers to the research question 4

Theme	Category	Codes	Informational Units from the transcript
What do you think is necessary for ecological activities to be an adequate pedagogical and didactic resource to instill ecological behavior in preschoolers?	Engaging nature-oriented activities	Ecological contexts Examples of practical works Didactic videos Games on ecological themes	"To organize more ecological contests" B.L "To use the exhibition of practical works and didactic videos for ecological activities" P.G. "Make more use of board games on ecological themes, personal example, and various contests and group games that can be played with children" L.S. "Involving children in small projects and making children aware that there is a result of their work" J.A.
	Age-appropriate activities	Adaptation to specific age categories	"Adaptation of ecological activities to the child's age level, and the examples should be impactful" A.M.

5. What skills do you think preschoolers develop as a result of participating in environmental education activities in kindergarten?

According to the content analysis, the ecological activities carried out by the teaching staff were very well accepted by the preschoolers and they developed competencies related to the following aspects: nature preservation, moral reasoning, artistic expression, social interactions and self-development. Moreover, these ecological activities helped the preschoolers to develop their ability to capitalize on the beauty of their lives (table 6).

Table 6. Theme, codes and categories of the answers to the research question 5

Theme	Category	Codes	Informational Units from the transcript
What skills do you think preschoolers develop as a result of participating in environmental education activities in kindergarten?	Competencies related to nature preservation	Ability to protect the environment Ability to selectively collect waste Responsibility Love for nature	"The skills they develop are: the skill, the ability to protect the environment, to selectively collect waste" **B.L**. "First of all, they will love the environment more by protecting it and develop their taste for beauty and aesthetic taste" **P.G.**

	Moral competencies	Moral values in action	"A very important skill is responsibility and how they can become thrifty, and they will be able to understand that the environment will look beautiful or ugly depending on how they take responsibility for the paper thrown on the floor or the paper that ends up in the trash." **L.S.**
	Artistic competencies	Appreciation of beauty	
		Artistic abilities	"I believe that ecological education develops both the moral side of children and the artistic-plastic side" **J.A**.
	Social competencies	Aesthetic taste	
	Self-development competencies	Communication abilities	"The skills they develop are multiple, from scientific skills, social skills and the discovery of certain passions, for example for biology, for the environment, for hydrology, to social skills in the sense that they become responsible adults" **A.I.**
		Appreciation of others	
		Ability to capitalize on the beauty of their lives	"...and the necessary skills to capitalize on the beauty in their lives" **B.L.**

6. In what ways do you think parents and/or relatives of preschoolers could contribute to environmental education activities in kindergarten?

The responses of the participants showed us that for the success of ecological activities is necessary to establish a good collaboration between the kindergarten and the parents. Thus, parents, through their attitude towards the teaching staff and towards the kindergarten, can influence the formation of different behaviors of children towards the environment. Parents can support teachers through involvement, developing responsibility, helping to carry out ecological activities and ensuring the continuity of ecological learning at home (table 7).

Table 7. Theme, codes and categories of the answers to the research question 6

Theme	Category	Codes	Informational Units from the transcript
In what ways do you think parents and/or relatives of preschoolers could contribute to environmental education activities in kindergarten?	Family-school partnership	Parental involvement	"Through our involvement and support in ecological activities" B.L.
		Support	"Through responsibility, involvement in ecological projects and help in the procurement of materials"P.G.
		Developing responsibility	
		Helping	"Through their involvement, our support in ecological activities and the continuation of work at home" L.S.
		Assuring continuity of ecological learning	

			"By involving primarily the parents who have jobs in these fields and continuing the work of the teaching staff at home" A.M.
			"By involving them in ecological activities and ensuring continuity at home" J.A.

7. In the future, would you like to participate in trainings for the implementation of environmental education activities in the group? How do you think these should go?

Analyzing the answers of participants to the last question, we noted the fact that all the teaching staff are willing to participate in specialization training in the field of ecological education. According to the teachers, these forms of EE training should take place more in the form of experiential learning, examples of successful EE programs, and they should be accessible in an onine environment, because in this way teachers from different areas and even countries can connect and exchange ideas and good practices (table 8).

Table. 8 Theme, codes and categories of the answers to the research question 7

Theme	Category	Codes	Informational Units from the transcript
In the future, would you like to participate in trainings for the implementation of environmental education activities in the group? How do you think these should go?	Need for parental training in ecological practices	Continuous training	"Of course yes, any training is welcome. I would like it to take place online" B. L.
		Learning by doing	"Yes, I gained more knowledge because my colleagues came with good practices" P.G.

	Type of training	Online environment Good practices Free discussions Exchange of ideas	"Yes, I would like to participate in the trainings to implement these activities and I think they should be conducted through practice, symposiums and competitions" L.S. "Yes, I would also like to participate in such trainings and meetings, but I would like them to be more free discussions like today's, not just speeches. I agree that this practical part should also be addressed at the symposia, where we can talk about what we do with the children in class and exchange ideas" J. A.

5. Discussions

Following the analysis of the data obtained during the focus group, we noticed that preschool teachers want to be continuously trained regarding to the implementation of ecological activities and they have a positive attitude regarding ecological education activities.

The teachers' perception of the ecological activities is a positive one and full of enthusiasm and dedication. The ecological activities described by the participants were carried out with many pedagogical techniques in order to bring the children closer to the environment and to the care of the environment by preschoolers. As a result of the ecological activities carried out by the teaching staff involved in the study, the preschoolers developed many positive skills and abilities regarding the environment and everyday life.

It was observed that the preschoolers participated with great enthusiasm and joy in the ecological activities and were actively involved in the development of the ecological activities. They developed competencies related to nature preservation, moral competencies, artistic competencies, social interactions and self-development competencies, such as ability to capitalize on the beauty of their lives. As indicated by the kindergarten teachers, the preschoolers developed abilities to protect the environment, ability to selectively collect waste, responsibility for the nature, love for and all this contributes to the formation of environmentally friendly behavior in preschoolers.

Through the pedagogical techniques used, the teaching staff managed to develop a partnership with the parents of the preschoolers, thus the teaching staff received support from the parents of the preschoolers in carrying out the ecological activities and the parents ensured the continuity of ecological learning at home.

More than that, the answer of one of the teachers to the last question "*Yes, I would also like to participate in such trainings and meetings, but I would like them to be more free discussions like today's*", confirms the fact that the focus group has achieved its goal and took place in a pleasant way, facilitating a safe space for discussions and reflections.

According with this study, the preschool teachers participating in the study carried out by Radu (2020) show curiosity and a clear desire to explore the environment, and through their attitudes towards the environment, they also convey to the children the desire to explore and understand the environment in which they live. Preschool teachers consider the environment to be a healthy environment for a full and harmonious emotional development of children. Preschool teachers also mention the positive impact of nature on children in terms of physical and mental health, as well as compassion, self-confidence and general well-being.

Robertson (2008) in his study, believes that the formation of a positive image of ecological education in preschoolers also depends on the way in which the teacher perceives and makes the environment aware.

It is also important that the education system promotes practical activities both in the classroom and in nature so that preschool teachers can build a holistic image of ecological education activities. This will support teachers in designing and teaching ecological education activities (Karakaya et al., 2022).

The findings of the study made by Gökçeli & Kandir (2015) show that when preschoolers are faced with environmental problems, preschoolers begin to form positive behaviors in relation to the environment and they activate their spirit of saving the environment.

In another study carried out by Kabadayi & Altinsoy (2018), the authors come to the conclusion that the more innovative methods the preschool teacher uses in teaching ecology, the more the child learns about the environment and becomes aware of the role of the environment in his life.

Flogaitis et al. (2005) conducted a study after which it was concluded that preschool teachers are of

two types: technocentric who adopt the measures and practices supported by EE and ecocentric, i.e. those who develop new solutions and actions to support the environment.

6. Conclusions

The aim of this study was to investigate in qualitative manner the perceptions of preschool teachers in a Romanian kindergarten in relation to environmental education and the cultivation of environmentally friendly attitudes and positiv behaviors in preschoolers.

The preschool teacher must be a good facilitator of the teaching-learning process. This role is a mandatory condition in the process of raising children's awareness in relation to the environmental problems facing humanity today. The preschool teachers participating in the study showed that they try to fulfill the objectives of EE during the act of teaching ecology and showed a clear desire to be trained in the field of EE. Through their actions and methods of teaching ecology, preschool teachers built the foundation of ecological education among their preschoolers.

Analyzing the results of this study, we can conclude that the focus group can be an appropriate method of analyzing the readiness of kindergarten teachers to be trained to implement EE with the aim of creating preschoolers that are able to reflect, think, search for and implement solutions to give the environment the rightful place in everyday life of the humanity. Preschoolers should be trained in relation to EE objectives starting from the premise that they are not the masters of nature and they must live in harmony with nature. The identified themes and categories in this study will allow to further design and implement kindergarten teachers' training programs in the direction of promoting ecological education for preschoolers, of encouraging preschool teachers to implement ecological education activities in their classes, having as final goal the instilling of ecological and environment-friendly mindset and behaviors in preschoolers.

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References

Ahi, B., & Balcı, S. (2017). Ecology and the child: Determination of the knowledge level of children aged four to five about concepts of forest and deforestation. *International Research in Geographical and Environment Education*, *27*(1), 1-16. http://dx.doi.org/10.1080/10382046.2017.1349372.

Alıcı, Ş. (2013). Recycle, reduce, reuse education for kindergarten children. (Unpublished master's thesis). Middle East Technical University, Ankara, Turkey.

Biber, K., Cankorur H., Sultan Güler, R., & Demir, E. (2022). Investigation of environmental awareness and attitudes of children attending nature centred private kindergartens and public kindergartens. *Australian Journal of Environmental Education*. *39*(1), 1–13. doi:10.1017/aee.2022.1.

Broyles, I. (2011). *Distributed Cognition Minicourse: An Instructional InterventionToimprove The Effectiveness Of One-Day Environmental Education Camps*. A Dissertation Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy Capella University, United States.

Carey, A. (1994). The group effect in focus groups: Planning, implementing and interpreting focus group research. *Sage Publications*, 225-241.

Cengizoğlu, S. (2013). Investigating potential of education for sustainable development program on preschool children's perceptions about human environment interrelationship (Unpublished master's thesis). Middle East Technical University, Ankara.

Erlingsson, C., & Brysiewicz, P. (2017). A hands-on guide to doing content analysis. *African Journal of Emergency Medicine*. *7*(3), 93-99. https://doi.org/10.1016/j.afjem.2017.08.001.

Ernst, J., & Burcak, F. (2019). Young children's contributions to sustainability: The influence of nature play on curiosity, executive function skills, creative thinking, and resilience. Sustainability. MDPI, *Open Access Journal*, *11*(15), 1–22. https://doi.org/10.3390/su11154212.

Evans, G. W., Otto, S., & Kaiser, F. G. (2018). Childhood origins of young adult environmental behavior. *Psychological Science*, *29*(5), 679–687. DOI 10.1177/0956797617741894

Ferreira, M. E., Caires, A. C., & Pitarma, R. (2016). Teaching Ecology to Children of Preschool Education to Instill Environmentally Friendly Behaviour. *International Journal of Environmental & Science Education*, *11*(12), 5619-5632.

Flogaitis, E., Daskolia, M., & Agelidou E. (2005). Kindergarten Teachers' Conceptions of Environmental Education. *Early Childhood Education Journal*, *33*(3), DOI: 10.1007/s10643-005-0039-x.

Gökçeli, K. F. (2022). Effect of the Environmental Education Program Integrated with Language Activities on 48 to 66 Month Old Children's Environmental Awareness. *International Journal of Early Childhood Education Studies*, *7*(1), 19-42. DOI: 10.37754/ 737103.2022.712.

Gokceli, K. F., & Kandir, A. (2015). The effect of environmental education program on 48-66 month old children's environmental awareness. *Education in the 21st Century: Theory and Practice*, ST. KLIMENT OHRIDSKI University Press.

Kabadayi, A., & Altinsoy, F. (2018). Traditional and Technological Methods for Raising Pre-school Childrenís Awareness of Environmental Pollution for Sustainability. *Discourse and Communication for Sustainable Education*, *9*(2), 134-144. DOI: 10.2478/dcse-2018-0020.

Kahriman-Öztürk, D. (2010). Preschool children's attitudes towards selected environment issues. (Unpublished master's thesis). Middle East Technical University, Ankara, Turkey.

Kahriman-Ozturk, D., Olgan, R., & Tuncer, G. (2012). A qualitative study on Turkish preschool children's environment attitudes through ecocentrism and anthropocentrism. *International Journal of Science Education*, *34*(4), 629-650.

Karakaya, F., Bozkurt, S., & Yilmaz, M. (2022). Developing Preschool Students' Awareness of Living Things: Fungi in Nature. *Pedagogical Research*, *7*(1), em0116, https://doi.org/10.29333/pr/11552

Kavaz, T., Kizgut-Eryilmaz, B., Polat, B., Amca-Toklu, D., & Erbay, F. (2021). Investigation of Preschool Children's Perceptions to Protect the Environment Through Drawings. *Theory and Practice in Child Development*, *1*(1), 41-55. https://doi.org/10.46303/tpicd.2021.4.

Kroufek, R., Janovec, J., Chytrý, V., Simonová, V. (2016). Environmental attitudes of preschool children and their parents. *INTED2016 Proceedings*.

Krueger, R. A., & Casey, M. A. (2014). Focus Groups: A Practical Guide for Applied Research. *SAGE Publications*, Thousand Oaks.

Marin, A. A., Rusu, A. S. (2023). Preschool environmental education: a systematic review. *Journal of Educational Science and Psychology*, *13*(1), 26-33.

Melis, C., Wold, P.-A., Bjørgen, K., Moe, B. (2020). Norwegian Kindergarten Children's Knowledge about the Environmental Component of Sustainable Development. *Sustainability*, *12*, 37. https://doi.org/10.3390/su12198037.

Robertson, J. S. (2008). Forming preschoolers' environmental attitude: lasting effects of early childhood environmental education. (Unpublished Master Thesis). Royal Roads University.

Tümer, K. N. B., & Temel, Z. F. (2021). Development Of Environmental Scale For Children. *Kastamonu Education Journal*, *29*(4), 11-21, Doi: 10.24106/kefdergi.789396.

Wilson, R. (2002). Promoting the development of scientific thinking. *Early Childhood News*. Retrieved from www.earlychildhoodnews.com/earlychildhood/ article_view.aspx?ArticleID=409.

World Organisation for Early Childhood Education. (2011). Education for sustainable development in the early years.

Behavioral Challenges for Children and Adolescents with Disabilities Using Social Media and Playing Video Games

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Behavioral Challenges for Children and Adolescents with Disabilities Using Social Media and Playing Video Games

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Abstract	
Keywords: social media; video games; disruptive behaviors; parents` perception; special needs.	Literature review shows an increasing interest in investigating the impact that social media and the use of video games have on typically developed children and adolescents, as the number of users has grown significantly, social media being the most popular activity engaged in by individuals online. This situation along with some inappropriate behaviors the users display as a consequence of a long exposure to different online contents, determined the inclusion of a psychiatric disorder of gaming addiction in reference manuals related to mental health. Nevertheless, the number of studies regarding children with disabilities and their engagement in online activities, including social media and video games is significantly smaller. The aim of this study is to identify the relationship between the use of social media and the occurrence of disruptive behaviors in students with special educational requirements, aged between 11 and 17 years old, according to the data collected from teachers, parents and relatives.

Zusammenfasung	
Schlüsselworte: soziale Medien; Videospiele; störende Verhaltensweisen; Wahrnehmung der Eltern; besondere Bedürfnisse.	Die Literaturrecherche zeigt ein zunehmendes Interesse an der Untersuchung der Auswirkungen sozialer Medien und der Nutzung von Videospielen auf typisch entwickelte Kinder und Jugendliche, da die Zahl der Nutzer*innen erheblich zugenommen hat und soziale Medien die beliebteste Online-Aktivität von Einzelpersonen sind. Diese Situation und einige unangemessene Verhaltensweisen, die die Nutzer*innen als Folge von langem Kontakt mit verschiedenen Online-Inhalten am Tag zeigen, waren ausschlaggebend für die Aufnahme der psychiatrischen Störung der Spielsucht in Referenzhandbücher für psychische Gesundheit. Dennoch ist die Zahl der Studien über Kinder mit Behinderungen und ihr Engagement in Online-Aktivitäten einschließlich sozialer Medien und Videospiele deutlich geringer. Ziel dieser Studie ist es, den Zusammenhang zwischen der Nutzung sozialer Medien und dem Auftreten störender Verhaltensweisen bei Schüler*innen mit sonderpädagogischem Förderbedarf im Alter von 11 bis 17 Jahren anhand der von Lehrern, Eltern und Verwandten erhobenen Daten zu ermitteln.

1. Introduction

Social media and video games are nowadays a central part of children and adolescents` lives. The past decades show a continuous rise in youth's digital media consumption (Lissak, 2018) and at the same time, the use of mobile devices which allows access to most types of content and encourages multi-screening as well as an immediate reward is creating a real concern among professionals (Falbe et al., 2015). Along with some real advantages related to a wider access to information and a faster communication, the recent years brought many studies associating screen exposure to health (cardiovascular system, sleep, vision) and psychological problems (behavioral and social outcomes) among children and adolescents (Lissak, 2018).

Nearly half of children and adolescents aged between 12 and 17 years visit different websites daily and spend an average of at least 1 h per day dedicated solely to social media use (Coyne et al., 2020).

According to recent data, about 93.8% of children or adolescents aged 10-14 had used internet services, studies showing that friendship networking sites may provide adolescents with more opportunities than face-to-face situations (Cheng and Lau, 2018).

At the same time, in 2021, statistics provided data indicating that more than two billion people played video games with a growth rate in 2022 and 2023. A great number of these are unfortunately children and adolescents (Matias et al., 2023). With the rapid increase of time spent in gaming and in the use of social media, some problematic behaviors have emerged leading to the inclusion of a psychiatric disorder of gaming addiction in reference manuals related to mental health (Matias et al., 2023).

Literature review shows an increasing interest in investigating the impact that social media and the use of video games have on typically developed children and adolescents, but the number of studies regarding children with disabilities is significantly smaller.

2. Theoretical foundation

Acun (2020) argues some of the previous studies and mentions that a low frequency in using social media by children and adolescents with a high level of self-esteem can diminish their risk of depression or of having a low life satisfaction. In his study, the same author states that individuals with lower self-esteem tend to use social media more often willing to improve precisely their self-esteem and also their self image, which is considered a very good predictor for social experiences, such as social acceptance, social behavior, the quality of the relationships and their consistency. Nevertheless, a great number of studies (Holtz & Appel, 2011, Kowalski et al., 2016, Coyne et al., 2020) tend to demonstrate that social media, beside some real advantages, have a negative impact on children and adolescents with different types of disabilities.

On the other hand, studies show that the age group with the highest ratio of Internet users is 12-17, weather we speak about typically developed or individuals with disabilities (Holtz & Appel, 2011). Taking into consideration the latest research (Coyne et al., 2020), new media provide dangerous content, including web pages with age-inappropriate material, violent and aggressive video games, unprotected chat rooms and discussion boards.

If we consider teens with disabilities and their misunderstandings of many social challenges, their vulnerability in facing reality and in discriminating between fake and real aspects presented on the Internet, we can easily understand that they are often victims of cyberbully (Kowalski et al, 2016), as well as of traditional bullying (Annerback et al, 2014) leading to different types of abuse (physical, emotional and sexual). Additionally, because individuals with disabilities, such as autism spectrum disorder, often have poor social skills, they also have very few social connections and those who lack Theory of Mind skills and who are, thus, unable to discern the intent of others may not recognize that they are actually having cyberbully actions (Kowalski et al., 2014).

Furthermore, children with ADHD or/and ASD seem to be victims as well as harassers in online and offline and some health conditions such as obesity, diabetes or physical disabilities can predispose these individuals to be victims of harassment due to their physical or functional differences (Kowalski et al., 2016). The consequences of cyberbully can be observed through internal problems, such as anxiety, depression, high degrees of loneliness and low self-esteem but also through external issues, meaning inappropriate behaviors, absence from school, decrease of school performance or some physical symptoms like headaches, stomach pains and sleep problems. The same issues could be found within the harassers` profiles beside antisocial behaviors and substance abuse in some cases (Cheng & Lau, 2018).

Several studies show that there is a connection between the use of social media and the occurrence of inappropriate or disruptive behaviors in children with disabilities. These behaviors could be determined either by low verbal skills, or by a poor capacity of understanding the meaning of some events or a difficulty of processing and controlling emotions. Additionally, the use of online platforms can lead, for children or adolescents with different types of disabilities, to interactions with an inappropriate content or with individuals who can involve them in disruptive behaviors (Cheng & Lau, 2018, Alfredsson Agren et al., 2020).

Studies found that for children between 10-12 years old, excessive screen use of 4 hours per day or more was significantly related to negative well-being symptoms like little interest in doing things, little appetite or interest in having good meals, wishes of being alone, crying easily for no particular reason, difficulties in falling asleep or staying asleep, feeling depressed or seeing future like something useless or dangerous (Yang et al., 2013).

Considering the increasing use of social media and video games among children and adolescents with disabilities, one of the main factor that needs to be approached is parents` perception. Parents perceive their children and adolescents as being more sensitive than others when interacting on the internet and state that they have to offer daily protection and support to ensure safe digital participation (Alfredsson Agren et al., 2020).

Most parents proved to be aware of the major risks represented by the use of social media and video games, meaning the exposure to harmful content, disclosure of personal information, ignoring existing friends and searching new ones in virtual communities, postponing school and family tasks due

to the great amount of time spent in online and the use of Internet without purpose (Inan-Kaya et al., 2018).

Staff and parents of adolescents with disabilities using the internet have been found to be concerned about some serious risks of inappropriate online content, such as pornography, cyberbully and sexual abuse, having a great impact on their behavior. Nevertheless the same parents consider that the advantages of using social media and internet are greater than the disadvantages (Molin et al., 2014). Moreover, parents have a positive attitude regarding the use of a smartphone by children and teens with disabilities (Heitplatz et al., 2021), this perception being determined by an easier communication, a rapid access to information, a greater feeling of belonging to a group and of acceptance from others.

Inan-Kaya and his colleagues (2018) specified the use of five types of parental mediation to reduce the risks of their children`s exposure to Internet content and video games. These refer to an active mediation of the Internet, which involves discussions between parents and children about activities and content within different websites, a mediation based on the secure use of the Internet, establishing rules and timing, the use of control and selection of the content or monitoring children through a detailed check-up of their telephone or laptop.

Parents' screen time and parental attitudes were significantly related to children's screen time as shown by Lauricella et al. (2015). As mentioned above, parents used active, restrictive and mediation strategies for technological devices. This means that parental education for awareness is one of the preventive and/or intervention solutions to make children understand the negative effects of using social media and video games excessively and to prevent the risks (Staksrud & Livingstone, 2009).

On the other hand, more parents understand their children`s disability and it`s impact on functioning, more they can set realistic expectations concerning their children`s future. In other words, if parents` well-being has a high level and their relationship with the child is tight enough, it will be easier for them to support the child or adolescent, offering a better understanding and guidance in using social media and in implementing strategies for reducing inappropriate and disruptive behaviors (Ryan & Quinlan, 2017).

3. Research methodology

3.1.Participants

This study had 31 teachers and 27 parents and caregivers of children with special needs as participants. These participants were selected based on the following criteria: they were either teachers, parents, or caregivers of children with special needs, and the referred children had to be between 11 and 17 years old and use social media, even minimally.

The relationship between the participants and the children was based on regularly interaction over the past six months. This allowed them to provide information about the children's behavior and made it easier for them to identify changes and difficulties related to social media use.

The demographic data collected showed that the age of the respondents who completed the questionnaire ranged from 23 to 56 years old. Most of them, 81%, were women, while the remaining 19% were men. Additionally, 81% of the respondents lived or taught in urban areas, while the remaining 19% lived in rural areas. Respondents had varying levels of education, including middle school, high school, vocational school, and university.

The participants described 58 children with age ranges between 11 and 17 years old. These children were studying in regular or special schools and exhibited disruptive behavior.

Figure 1. Age distribution among children
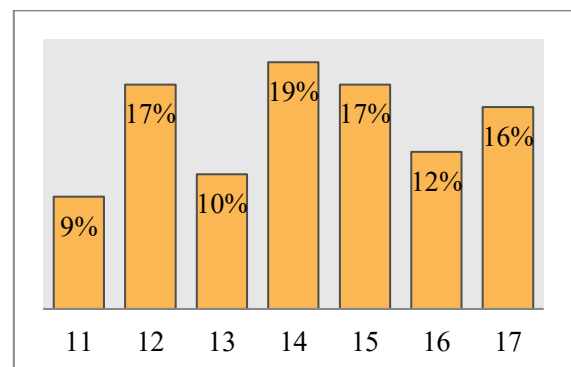
Each child had a diagnosed syndrome or disability. The most common diagnoses were autism spectrum disorder (ASD), intellectual disability, learning disability and attention deficit hyperactivity disorder. A smaller percent of children had other diagnoses including Down syndrome, multiple disabilities, physical disability, hearing loss, visual impairment and Tourette syndrome.

Figure 2. Children's Disability Types
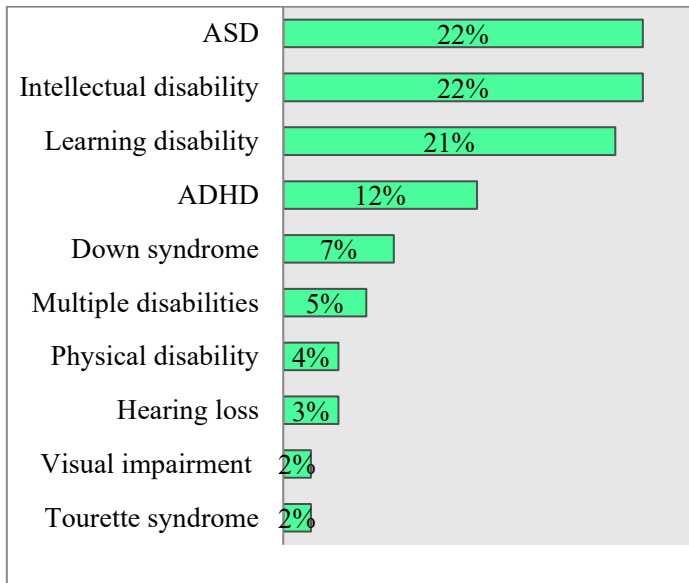
The presence of disruptive behaviors was crucial to assess their potential connection to social media. Participants reported various disruptive behaviors. Teachers observed students with special needs making noises to distract peers, leaving their seats, bullying others, interrupting activities, refusing to participate, showing disrespect toward teachers, taking objects without permission, destroying them, using an inappropriate language and using smartphones during activities. Parents and caregivers reported behaviors such as throwing objects, coming home late, pushing, screaming, not taking turns, interrupting discussions, failing to complete homework, and displaying opposition or defiant behavior.

3.2. Instruments

3.2.1. Social Media Use and its Influence on Disruptive Behaviors Questionnaire

This questionnaire was developed for the current research due to the absence of standardized instruments to investigate the influence of social media use on disruptive behaviors.

This instrument was divided into two main parts. The first part included demographic data about the participants (including initials, age, gender, residence, studies, and their relationship with the child) and the children (including age and disability). The second part investigated social media and video games use and its impact on disruptive behaviors from the perspectives of teachers and parents/caregivers.

The participants were able to access both multiple-choice questions and open questions to provide information in a genuine way.

On one hand, questions regarding social media use included details about the apps, favorite content, and time spent on them. On the other hand, participants were asked about observing disruptive behaviors in children after they used social media, whether children tried to imitate online content in real life, or they believed these disruptive behaviors were solely a result of the diagnosis, or if social media and video games use could also influence their occurrence.

The results of this questionnaire were converted into percentages in order to observe the general trend.

3.2.2. Disruptive Behavior Disorder Rating Scale (DBDRS)

The DBDRS (Pelham et al., 1992) is a 45-question scale used to identify symptoms of attention deficit hyperactivity disorder (ADHD), opposition defiant behavior disorder, and conduct disorder in children aged 5 years or older.

The questions can be completed by the parent/caregiver or the teacher of the child, each of them showing four possible responses: "not at all", "just a little", "pretty much", "very much".

The scale has two scoring methods:

1. The first method counts only the "pretty much" and "very much" responses and calculates a score for each disorder mentioned above. For the attention deficit hyperactivity disorder, items are assigned for each type (the primarily inattentive type, the primarily hyperactive and impulsive type, and the combined type). Items are also assigned for opposition defiant behavior disorder and conduct disorder, with the latter being divided into four sub-types: aggression to people and animals, destruction of property, deceitfulness or theft, and serious violation of rules.

2. The second scoring method involves assigning a number of points to each answer. Specifically, a "not at all" answer receives 0 points, a "just a little" answer receives 1 point, a "pretty much" answer receives 2 points, and a "very much" answer receives 3 points. This scoring method is used to calculate the score only for opposition/defiant behavior, inattention, and impulsivity/ over-activity. A table of norms is then consulted.

We chose the first scoring method because it is more comprehensive and can identify the specific areas of difficulty for each child with special needs described in this study, ensuring clear and precise distinctions between the mentioned types.

3.2.3. Strengths and Difficulties Questionnaire (SDQ)

The SDQ (Goodman, 1997) is a short behavioral screening instrument designed for children aged between 4-10 and 11-17 years old. It offers various versions customized for completion by teachers, parents, caregivers, or the children themselves.

There are 25 main questions using a Likert scale with response options "false", "more or less true", and "definitely true". These questions assess psychological attributes, and each scale contains 5 items. The scales cover emotional symptoms, conduct problems, hyperactivity/ inattention, peer relationship problems, and prosocial behavior. Notably, the sum of the first four scales generates a total difficulties score.

In addition to the main questions, the instrument includes a supplement with several questions that investigate difficulties in areas such as concentration, emotions, behavior, interpersonal relationships, learning, family life, and leisure time.

The scoring is done by awarding 0 points for a "false" response, 1 point for a "more or less" response and 2 points for a "definitely true" response, except some reverse items, where the scores will also be reversed. The score will be calculated for each of the five scales; in this case the scores will vary between 0 and 10 points. A total difficulty score can also be calculated, and it can range between 0 and 40 points (the score for the prosocial behavior scale will not be taken into consideration). An externalizing score is also calculated, which will vary between 0-20 points and will be the sum of the scales "conduct problems" and "hyperactivity", and an internalizing score, as the sum of the scales "emotional symptoms" and "peer relationship problems".

The supplement score can reach a maximum of 10 points in the parents or caregivers version and a maximum of 6 points in the teachers' version, with scores of 0 for "not at all" and "just a little", 1 for "quite a lot", and 2 for "very much". The questions about chronic and respondent burden were not included in the impact score.

3.3. Procedure

The data were collected through the virtual platform "Google Forms" which enabled indirect communication with the target group, where completing the questionnaires was the only task.

The virtual form was shared in parents' and teachers' virtual groups. It included a suggestive image with the research title and a text description that specified the eligibility requirements, completion time, and provided two distinct links, one for teachers and one for parents / caregivers.

When accessing the form, participants had to read study details and complete an informed consent regarding personal data.

The participants' responses were converted into charts and tables using the scoring methods of each instrument chosen for the study. For the first questionnaire, in the absence of a scoring method, the answers were transformed into percentages to observe general tendencies.

This quantitative research, characterized by objectivity and a neutral interpretation of data, aimed to establish connections between variables, make predictions, and generalize results to some extent. Several advantages of using online questionnaires as a research method were observed, including participant anonymity (no requirement for full names or email addresses), convenience (accessible on various devices at any time and location), reach (enabling a larger participant pool), flexible completion time (no timer constraints), and efficient data storage (all responses saved in an easily accessible virtual database).

4. Results

Starting from the hypothesis that social media represents a factor contributing to the emergence of disruptive behaviors among children with special needs, aged between 11 and 17 years old, we will now present the results obtained for each instrument.

4.1. Social Media Use and its Influence on Disruptive Behaviors Questionnaire

Selecting the most well-known and used apps among the Romanian population and noting that each participant could choose more than one answer, the group of children showed a preference for the following social media platforms: TikTok (74,14%), Facebook (72,41%), Youtube (68,97%), Messenger (58,62%), video games (58,62%), Whatsapp (51,72%), Instagram (51,72%), Snapchat (36,21%), Pinterest (24,14%) and Telegram (1,72%).

When it comes to the preferred content type, the children in our study would choose: entertaining videos (82,76%), stories (70,69%), pictures (63,79%), music (60,34%), video games (55,17%), private chats (48,28%), educational videos (36,21%), live streaming (36,21%) and GIFs (22,41%).

The average time spent using social media in a day by the students with special educational needs mentioned in this study is divided as follows:

Figure 3. The average time spent on social media by the students
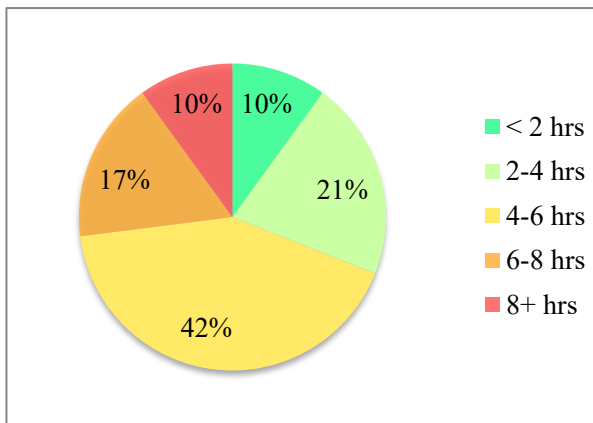
Evidence show that the majority, comprising 42% of them, spend an average of 4-6 hours per day using social media. Out of the whole group, 21% spent between 2 and 4 hours, while 17% even allocate between 6 and 8 hours. On the other hand, at the opposite extremes, there are situations where 10% spend less than 2 hours a day, while 10% have a screen-time of more than 8 hours. The relatively increased time can also be explained from the perspective of a discomfort that may arise when the child either fails to achieve his gaming objectives, either feels that exiting the app might be an obstacle in his interaction with his favorite content.

Figure 4. The influence of social media on children's disruptive behaviors
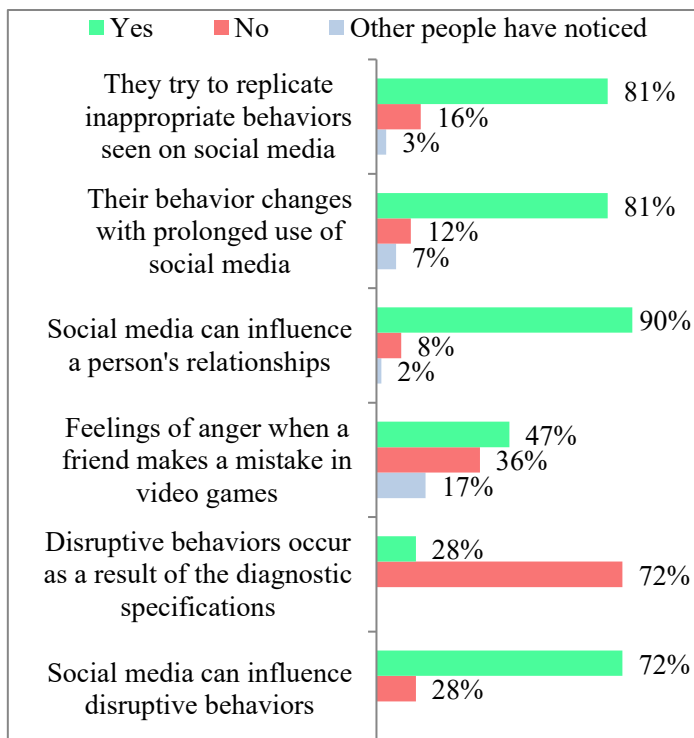
At the group level, a percentage of 72% is notable, represented by participants who believe that social media leads to negative behaviors, and 8% is the percentage of those who consider that inappropriate behaviors are due to the diagnostic categories. It is important to mention that certain types of disabilities can be the cause of the emergence of such behaviors. There are situations in which individuals diagnosed with various disorders exhibit behaviors that are not entirely accepted in society. These behaviors are commonly observed during adolescence, especially when there is also a diagnosis of intellectual disability, and other inappropriate behaviors can interfere with the child`s life, leading to feelings of frustration, fear, or sense of uselessness. We want to mention that the purpose of this study is not to explain the presence of disruptive behaviors in this population as solely the result of interacting with inappropriate media content, but to determine whether social media is one of the factors that can explain the occurrence of these inappropriate behaviors.

4.2. Disruptive Behavior Disorder Rating Scale (DBDRS)

The disruptive behaviors targeted by this instrument assessed the degree of eligibility for the following disorders: attention deficit hyperactivity disorder, opposition defiant behavior disorder, and conduct disorder.

The participants' responses regarding children were represented in the following table:

Table 1. The eligibility among children and adolescents on the DBDRS instrument

	Attention deficit hyperactivity disorder
Inattentive	21%
Hyperactive-Impulsive	8%
Combined	0%
	Opposition defiant behavior disorder
Eligible	31%
Ineligible	69%
	Conduct disorder
Eligible	28%
Ineligible	72%

Out of the 58 children referenced by the participants throughout the study, 29% of them would meet the criteria for the attention deficit hyperactivity disorder, according to the analysis of the scores

included in the instrument. The majority of these, represented by 21% correspond to the inattentive type of this disorder, characterized by behaviors such as: short attention span, poor concentration ability, careless mistakes, forgetfulness or loss of items, disorganization, difficulty following instructions, and constant task or activity shifting. Only 8% would exhibit behaviors that would categorize them as the hyperactive-impulsive type of this disorder, and examples of such observable behaviors include: an inability to sit still when expected, a constant state of physical restlessness that impairs their ability to focus on tasks, difficulty waiting their turn, interrupting others in conversations and appearing to act without considering consequences. Following the analysis of the results, it is evident that no individual meets the criteria for the combined type, which involves a combination of symptoms from the inattentive type and the hyperactive-impulsive type.

Although 69% would not be eligible, 31% could meet the criteria for the opposition defiant disorder. While it is not the majority, the 31% is still quite high, indicating the presence of these difficulties. Opposition and defiant behavior can be characteristic during the ages of 11-17 and can be observed in both typical individuals and those with various diagnostic categories. Any young person experiencing the changes of puberty will need to undergo physical and psychological adjustments that can seem overwhelming. It is not uncommon for individuals of this age to have a desire to take control of their own lives and exhibit negative behaviors directed towards their parents or teachers. In the case of disorders that affect their self-esteem, integration into a group or society may not occur as the individual desires.

For the behavior disorder, only 28% of children would be eligible, while 72% would be ineligible although we cannot rule out the fact that the content a person interacts with through online platforms plays a significant role in the emergence or even exacerbation of inadequate behavior. For example, video games can incite violence and delinquent behaviors: at this age, not fully understanding the risks and consequences, a child may wonder what it would be like to enact in real life some of the actions they perform so easily in the game.

On the other hand, the videos they interact with can contain a wide range of messages, from jokes that can endanger others' health to experiments that can threaten their safety, as well as racism, harassment, tricks to defy the law, and illegal ways to make money.

Without support from significant people, guidance, communication, and sharing, some behaviors can either be reproduced by them just to see if the desired effect is achieved or can influence their attitude and behavior through content and subliminal messages.

4.3. Strengths and Difficulties Questionnaire (SDQ)

The scoring for this instrument was performed by calculating the responses for each targeted area and placing them into the most recent classification, which, unlike the one used in the past that included only three categories (normal, borderline, abnormal), is divided into four distinct categories (close to average, slightly high, significantly high and very high), as follows:

Figure 5. The SDQ scores on each targeted area
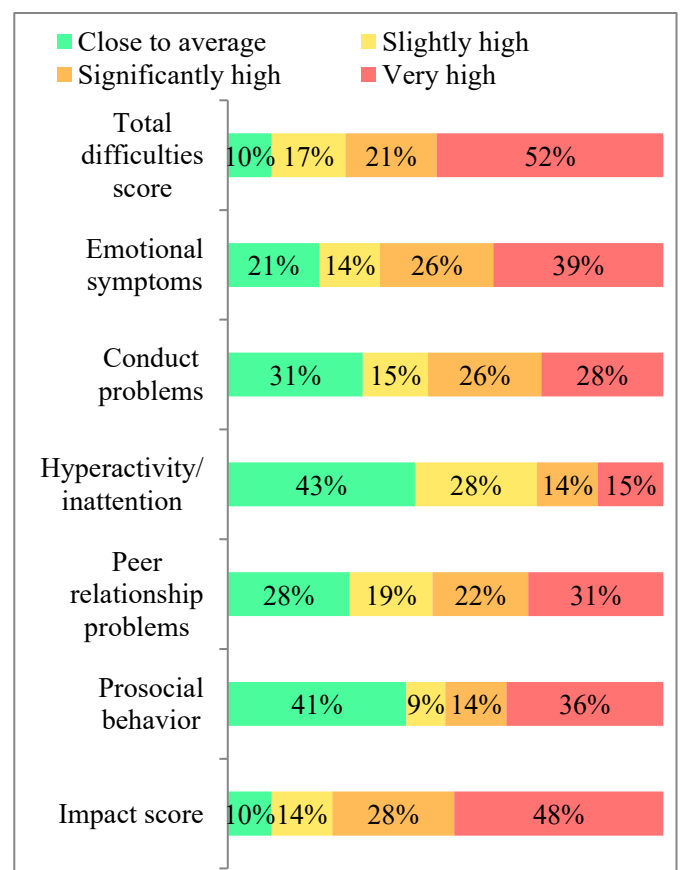
The total difficulties score was calculated by summing the scores of the following areas: emotional symptoms, conduct problems, hyperactivity/inattention and peer relationship problems. The interpretation of the findings stresses out that a majority of the children (52%) display a significantly elevated level of difficulties, with merely 10% of the total cohort approach the average levels observed in individuals of the same age who do not manifest significant challenges in the mentioned areas.

The emotional symptoms area, which includes items associated with feelings of anxiety, complaints

of headaches, expressions of unhappiness, restlessness, and fear, revealed that merely 21% of children displayed emotionally related behaviors within proximity to the average. On the contrary, 26% of them scored significantly high in this domain. Moreover, a substantial 39% of the children obtained very high scores, indicating that they experience various worries and internal distress. These emotional challenges may become observable in their external behavior and have the potential to exert influence across all the fields of an individual's functionality.

In the context of conduct problems area, a relatively high percentage, represented by 31% children, would not exhibit problematic behaviors that significantly differ from what is typically considered developmentally appropriate for their age. However, a closer analysis show that at least 69% would struggle with some form of behavioral issues. Within this 69% facing behavioral issues, only 15% exhibit minor behavioral concerns, while 26% have moderate problems. Moreover, a notable 28% contend with disruptive behaviors, including but not limited to outbursts of anger, episodes of violence, causing harm to others, theft, disobedience and instances of deceit.

The presence of hyperactivity and inattention within the target group varies, ranging from mild to severe, with 57% of individuals displaying these symptoms. Contrarily, a significant percentage, specifically 43%, does not display signs of restlessness, motor or verbal agitation, poor concentration, or impulsive behavior.

If 28% do not encounter difficulties in interpersonal communication, the remaining 72% do not establish the anticipated peer relationships characteristic for their age group. This divergence may stem from a tendency towards solitary behavior and a preference for spending more time alone, a lack of popularity among their peers, experiences of harassment, or a preference for engaging in conversations and social interactions with adults.

The items related to prosocial behavior area received a significant percentage of 41% children displaying amiability, willingness to assist others, desires for sharing, and consideration for others' feelings, while 59% would struggle with prosocial behaviors. In the case of certain disabilities, this difficulty may be attributed to a reduced empathetic capacity.

The impact score was calculated by analyzing the responses to the questionnaire's supplement. The impact essentially measures the extent to which these difficulties that children face affect their family life, friendships, learning, or leisure activities. Furthermore, it assesses the extent to which these issues elicit sadness or disruption in students. Notably, 48% of the described children achieved markedly high impact scores, signifying that emotional, behavioral, hyperactivity, and peer relationship issues significantly affect their personal, familial, and academic well-being.

5. Discussions

The literature review indicates that contemporary society witnesses widespread use of social media among both typical children and teenagers, including those with disabilities. Its global prevalence spans diverse age groups, prompting a specific focus on children and adolescents aged 11-17 in this study. This demographic group is of particular interest due to their perceived vulnerability at this developmental stage, influenced by various factors affecting behavior and well-being.

Within this demographic group, social media usage is characterized by an access to diverse content types, including text-based, visual, video, audio, interactive, educational, news, and emotional support content. Among the 58 adolescents surveyed, the top five applications were TikTok, Facebook, YouTube, Messenger and video games. Notably, user-generated videos dominated the content viewed because of their diversity and varying explicitness.

While the use of social media offers distinct advantages (broader access to information, increased opportunities for interactions, faster communication), it also involves inherent risks (inappropriate content, cyberbully, unprotected online conversations, violent media content). When observed over time, these risks may be displayed as issues in areas such as health, psychological well-being, or behavioral conduct.

It is crucial to highlight that within the examined cohort, a noteworthy proportion engages with social media extensively. Specifically, while 10% of students, on average, use social media for less than 2 hours daily, our study reveals that 21% spend between 2 and 4 hours, the majority (42%) between 4 and 6 hours, and 17% between 6 and 8 hours. An alarming finding is that 10% report usage exceeding 8 hours. Given the considerable time invested online, it becomes imperative to inquire whether the content they interact with has a discernible association with their observed behavioral challenges.

On the contrary, video games offer an avenue for adolescents to explore and immerse themselves in a novel virtual environment. In this sphere, they can assume alter egos, shaping their appearance and skills to align with personal preferences. Despite the existence of educational games designed to enhance logical thinking, problem-solving, and social engagement, the gaming market predominantly features content with a focus on violence. This content holds particular charm for young boys, offering an appealing online multiplayer experience with friends.

Our perspective affirms that every aspect of a child's interaction contributes to internal and external changes. As evidenced by our findings, 64% of adolescents express at least one negative emotion, such as for instance, anger, when a friend makes a mistake during a video game. Meanwhile, 36% either refrain from playing video games completely or engage with content that does not emphasize violent themes.

Social media and video games offer immediate gratification for children and adolescents aged 11 to 17, including those with disabilities. These platforms serve as tools for seeking acceptance, enhancing self-esteem and self-image. However, they can also be avenues for cyberbully - a form of aggressive behavior that may persist over extended periods (Morgan, 2016), involving both victimization and perpetration.

Similarly, when the disability level ranges from moderate to severe, the susceptibility to negative influences is intensified. The prevalence of disruptive behaviors varies, influenced by the degree of intellectual disability (Molteno, 2001). In such cases, vulnerability may be pronounced, with individuals potentially lacking a developed Theory of Mind. Moreover, they may struggle to discern right from wrong or distinguish between reality and misinformation, particularly when exposed to information presented on the Internet.

In our study, the majority of adolescents with disabilities attempted to imitate inappropriate behavior observed on social media. Prolonged use of virtual apps was associated with observable changes in their behavior. These adolescents encountered challenges in various domains, including emotional well-being, behavior, peer relationships, prosocial behavior, and hyperactivity. While acknowledging that some difficulties may stem from the diagnosis, our results suggest that social media use may also amplify certain challenges for this population.

6. Conclusions

Behavioral challenges often emerge in children and adolescents aged between 11 and 17 years old. These challenges are observable not only in the typical population but also in those with disabilities. It is crucial for us to examine the potential causes and contributing factors to better assist and support this age group. Identifying these causes is of primary importance because, over time, children may struggle with internal issues and exhibit external problems, including disruptive behaviors in various settings such as school or home.

Both the existing literature and our study share the common goal of exploring a potential link between behavioral challenges in this specific cohort and their engagement with social media - an omnipresent aspect of contemporary life. Instead of surveying the children and adolescents with special needs directly, we directed our investigations to their parents, caregivers, and teachers. These individuals were well-positioned to provide objective responses based on longitudinal observations.

We discovered that most participants believe social media usage can influence challenging behaviors in teens, while a minority asserts that disruptive behaviors occur solely due to diagnostic specifications. Moreover, our results indicate that the majority of these students face challenges in various domains, including conduct problems. Some may even qualify for opposition defiant behavior disorder or a conduct disorder, and interestingly, all these individuals were active users of social media.

It is essential to acknowledge that a behavior can be influenced by one or multiple factors. Challenging behaviors may arise from low verbal skills, a limited capacity to understand others, or personal emotions, as well as the interpretations of certain events. Through the use of social media and engagement in video games, children may also be seeking various objectives, whether it be acceptance, friendships, knowledge, freedom of expression, or the empowerment of decision-making.

While online access should not be prohibited, it is crucial for parents and specialists to analyze and manage it. This emphasizes the significance of a multidisciplinary team, comprising specialists in the field, as well as the child's parents or caregivers. Transforming challenging behavior can be a complex process, but with dedication and consistency from everyone involved, positive changes can occur over time.

Parents play a pivotal role and should actively contribute by monitoring online activity, limiting access to potentially harmful sites and apps, imposing time constraints and attentively addressing the emotional needs of their children. With support from key figures, along with strategies and therapies, children and adolescents can work towards diminishing challenging behaviors, ultimately improving their relationships, well-being, and overall quality of life.

Authors note: The authors have equal contributions to this article.

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References

Acun, I. (2020). The Relationship among University Students' Trust, Self-Esteem, Satisfaction with Life and Social Media Use. *International Journal of Instruction, 13*(1), 35-52. doi:10.29333/iji.2020.1313a

Alfredsson Ågren, K., Kjellberg, A., & Hemmingsson, H. (2020). Internet opportunities and risks for adolescents with intellectual disabilities: a comparative study of parents' perceptions. *Scandinavian Journal of Occupational Therapy*, 1-13. doi:10.1080/11038128.2020.1770330

Cheng, C. HK., & Lau, V. CY. (2018). Do Social Networking Sites Behaviour and Self-esteem Predict Young People's Delinquent Behaviour in Their Actual Lives? *Sociology and Criminology*, 6(1), [177]. doi:10.4172/2375- 4435.1000177

Falbe, J., Davison, K.K., Franckle, R.L., Ganter, C., Gortmaker, S.L., Smith, L., Taveras, E.M.

(2015). Sleep duration, restfulness, and screens in the sleep environment. *Pediatrics*, 135 (2), 368–375. doi:10.1542/peds.2014-2306.

Goodman, R. (1997). The Strengths and Difficulties Questionnaire: A Research Note. *Journal of Child Psychology and Psychiatry, 38*(5), 581-586. doi:10.1111/j.1469-7610.1997.tb01545.x

Heitplatz, V. N., Buhler, C., & Hastall, M. R. (2021). Usage of digital media by people with intellectual disabilities: Contrasting individuals' and formal caregivers' perspectives. *Journal of Intellectual Disabilities*, 1-22. doi:10.1177/1744629520971375

Holtz, P., Appel, M. (2011) Internet use and video gaming predict problem behavior in early adolescence. *Journal of Adolescence* 34, 49-58.

İnan-Kaya, G., Mutlu-Bayraktar, D., & Yılmaz, O. (2018). Digital Parenting: Perceptions on Digital Risks. *Kalem Uluslararasi Egitim ve Insan Bilimleri Dergisi, 8*(1), 131-157. doi:10.23863/kalem.2018.96

Kowalski, R.M., Morgan, C.A., Drake-Lavelle, K., Allison, B. (2016). *Computers in Human Behaviors*, 57, 416-427.

Kowalski, R. M., Giumetti, G., Schroeder, A., & Lattanner, M. (2014). Bullying in the digital age: a critical review and meta-analysis of cyberbullying research among youth. *Psychological Bulletin*, 140, 1073e1137.

Lauricella, A. R., Wartella, E. and Rideout, V. J. (2015). Young children's screen time: The complex role of parent and child factors. *Journal of Applied Developmental Psychology*, *36*, 11-17.

Lissak, G. (2018) Adverse physiological effects of screen time on children and adolescents: Literature review and case study. *Environmental Research*, 164, 149-157. https://doi.org/10.1016/j.envres.2018.0 1.015

Matias, C.N., Cardoso, J., Cavaca, M.L., Cardoso, S., Giro, R., Vaz, J., Couto, P.A., Dores, A., R., Ferreira, T.R., Tinsley, G.M., Teixeira, F.J. (2023). *Computers In Human Behavior*, 148, 107901.

Molin, M., Sorbring, E., & Lofgren-Martenson, L. (2014). Teachers' and parents' views on the Internet and social media usage by pupils with intellectual disabilities. *Journal of Intellectual Disabilities, 19*(1), 22-33. doi:10.1177/1744629514563558

Molteno, G., Molteno, C. D., Finchilescu, G., & Dawes, A. R. (2001). Behavioural and emotional problems in children with intellectual disability attending special schools in Cape Town, South Africa. *Journal of Intellectual Disability Research, 45*(6), 515-520. doi:10.1046/j.1365-2788.2001.00368.x

Morgan, C. A., Drake-Lavelle, K., Allison, B., & Kowalski, R. M. (2016). Cyberbullying among college students with disabilities. *Computers in Human Behavior, 57*, 416-427. doi:10.1016/j.chb.2015.12.044

Pelham, W. E., Gnagy, E. M., Greenslade, K. E., & Milich, R. (1992). Teacher Ratings of DSM-III-R Symptoms for the Disruptive Behavior Disorders. *Journal of the American Academy of Child & Adolescent Psychiatry, 31*(2), 210-218. doi:10.1097/00004583-199203

Ryan, C., & Quinlan, E. (2017). Whoever shouts the loudest: Listening to parents of children with disabilities.

Journal of Applied Research in Intellectual Disabilities, 31, 203-214. doi:10.1111/jar.12354

Staksrud, E. and Livingstone, S. (2009). Children and online risk: Powerless victims or resourceful participants? *Information, Communication and Society*, *12*(3), 364-387. doi: 10.1080/13691180802635455.

Yang, F., Helgason, A. R., Sigfusdottir, I. D. and Kristjansson, A. L. (2013). Electronic screen use and mental well-being of 10-12 year old children. *European Journal of Public Health*, *23*(3),   492-498.

Exploring the Pathways to Digital Education: The Roles of Satisfaction with Learning and Impulsive Behavior as Predictors of Openness and Attitude towards Digital Applications

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Exploring the Pathways to Digital Education: The Roles of Satisfaction with Learning and Impulsive Behavior as Predictors of Openness and Attitude towards Digital Applications

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Abstract	
Keywords: education; learning; impulsive buying; digital applications.	The present research aims to investigate the impact of satisfaction with learning, risk-taking behavior, impulsive buying behavior, attitudes, and openness toward adopting new applications, on 296 respondents. The study's results allows the significant highlighting of the relationship between satisfaction with learning and attitudes toward digital applications. Individuals exhibiting higher satisfaction with their learning experiences tended to display a slightly more favourable attitude towards adopting applications. Linear regression analyses revealed significant predictive factors, underscoring the influence of individual characteristics on attitudes and openness towards applications. Of particular importance were impulsive behaviour and satisfaction with learning, which emerged as consistent predictors, emphasizing the role of personal traits and experiences in shaping perceptions of digital applications. The findings contribute to the existing body of knowledge and hold implications for educational strategies, consumer behaviour, and technology adoption.

Zusammenfasung	
Schlüsselworte: Bildung; Lernen; impulsiver Kauf; digitale Anwendungen.	Die aktuelle Studie zielt darauf ab, die Rolle der Zufriedenheit mit dem Lernen, der Risikobereitschaft, des impulsiven Kaufverhaltens, der Einstellungen und der Offenheit gegenüber der Einführung neuer Anwendungen bei 296 Befragten zu untersuchen. Die Ergebnisse der Studie liefern wertvolle Einblicke in die Beziehung zwischen der Zufriedenheit mit dem Lernen und der Einstellung zu digitalen Anwendungen. Personen, die mit ihren Lernerfahrungen zufriedener waren, neigten dazu, eine etwas positivere Einstellung zur Einführung von Anwendungen zu zeigen. Lineare Regressionsanalysen ergaben signifikante prädiktive Faktoren, die den Einfluss individueller Merkmale auf die Einstellung und Offenheit gegenüber Anwendungen unterstreichen. Von besonderer Bedeutung waren impulsives Verhalten und Zufriedenheit mit dem Lernen, die sich als konsistente Prädiktoren herausstellten und die Rolle persönlicher Eigenschaften und Erfahrungen bei der Wahrnehmung digitaler Anwendungen betonten. Die Ergebnisse tragen zum bestehenden Wissensstand bei und haben Auswirkungen auf Bildungsstrategien, Verbraucherverhalten und Technologieübernahme.

1. Theoretical foundation

1.1. Learning

Learning is one of the most important aspects of human life for each of us. The complexity and importance of this process determines its approach from a pedagogical but also a psychological perspective. The achievement and improvement of each individual's personality expresses the deep emphasis of the social process and phenomenon called learning. The concept of learning involves change in behavior, assimilation of information and knowledge, and the development of affective and attitudinal states (Schaffer, 2005).

The current educational space represents a psychosocial context in which actors involved in the learning process meet in order to go through and achieve common cognitive, affective and behavioral objectives. The pace and frequency of learning for each individual are significantly influenced by their personality type, the understanding of each individual's needs and personal style, all of which represent an absolutely necessary element in the instructional-educational approach. In order to achieve efficiency in the learning process, each individual must be supported, and appreciated for every effort they allocate in learning activities.

In a broad sense, learning involves the production of a change in behavior through the accumulation of individual experiences and their adaptation to one's own attitudinal and behavioral system (Capretz,

2006). Learning is presented as a psycho-pedagogical process of adapting the body to the external demands of the environment, aiming at a harmonious development of the individual, the emergence of new capacities and skills and the construction of new experiences that can support the person in optimizing relationships with those around him (Ryan & Deci, 2000; Șițoiu & Pânișoară, 2023).

Recent research on the learning phenomenon has highlighted another side of it, that of seeing learning as a change and personal development, with a major role on the use and understanding of information in order to develop some social skills (Felder & Brent, 2005).

1.2. Attitude towards digital applications

The attitude of consumers towards the use of online applications is open to this system. Valkenburg and Taylor (2018) indicate that a large part of consumers have a stronger intention to use applications if they offer an easy-to-use mechanism. Their research demonstrates that those applications that allow consumers to optimally interacts and creates an opening to the product content at this moment, manifesting a strong impact on the consumer who uses that application for efficient time management.

Selim (2007), the consumer's attitude to use online applications is also related to also related to the previous information held by him in the use of technology. On the other hand, this consumer behavior towards technology is also important to boost their motivation and interest in online shopping (Yang & Lin, 2010).

When we discuss the progress of technology, it is necessary to signal its significance on the progress of the quality of life in terms of consumer behavior. The appearance of a multitude of digital software is a response to the consumer's need to improve time management and well-being while shopping. Studies in the fields of product management and consumer psychology have tried to develop a path of access as natural as possible between the consumer profile and the product sales sites. (Valkenburg & Taylor, 2018)

The online shopping process requires a certain indicator of digital independence and motivation from the individual in terms of online accessibility, but this indicator is also necessary to be found among employees (Warren, 2007).

The fast dynamism of technology leads to finding it in all social fields, so that it makes its presence felt in many daily activities of a person. (Rawashdeh, 2015).

1.3. Impulsive and risk-taking behaviors

Impulsive behavior reflects a tendency to act without long-term thought, an insensitivity to consequences, and an inability to inhibit certain behaviors deemed inappropriate (Awhile & Tajamul, 2022; Reynolds et al., 2006). Although most often impulse buying has a strong link to the emotional dimension, there is also a cognitive component that manifests itself in the context of choosing short-term benefits despite the potential negative and long-term consequences (Shahjehan et al., 2012). This leads to significant consequences both in terms of personal finances and in terms of emotional state or general satisfaction.

Several studies have shown that certain individual traits can influence impulsive buying behavior, in that people with high levels of extraversion, neuroticism, openness to new experiences have a greater tendency to engage in impulsive buying (Farid & Ali, 2018; Shahjehan et al., 2012; Thompson & Prendergast, 2015). Moreover, the easy access to the internet and the much faster opportunity to buy which is facilitated by online commerce predisposes to impulsive buying behavior (Berceanu et al., 2023; Lim et al., 2017).

The study of Herabadi et al. (2009) showed that the shopping experience is different for impulsive buyers than for non-impulsive buyers. On an emotional level, impulsive buyers are determined in their momentary choices by emotions such as pleasure and excitement. At the cognitive level choices are determined by hedonic rather than utilitarian reasoning (Herabadi et al., 2009).

In relation to openness to the use of some digital apps, although Billieux et al. (2015) study did not directly investigate the concept of openness to the use of digital apps, it implies that people's interactions with mobile phones may differ significantly. Some people may use their phones excessively and problematically due to impulsivity-related factors and may be more prone to impulsive behaviors, which could lead them to engage in excessive and problematic mobile phone use. The study of Awhile & Tajamul (2022) investigated the relationship between impulsiveness and digital wallet usage, which revealed a notable association between the two variables. Despite its specific focus on a particular aspect of impulsive behavior and digital technology, the study implies that individuals inclined towards impulsivity

might display a greater propensity for utilizing digital wallets in making impulsive purchases.

A key concept that relates to consumer behavior is that of choice, which involves taking a risk. Since the outcome of a choice can usually only be known in the future, the consumer is faced with uncertainty or risk. The perception of risk in a given situation is a feature of consumer behavior, as risk can be perceived as having negative consequences or causing anxiety (Taylor, 1974). The perception of the degree of risk in a given situation depends on a number of personal characteristics that may affect how the person chooses to cope with the risk (Taylor, 1974). There is no research that directly highlights the link between risk-taking and openness to app use, but there are some lines of research linking this variable to impulsive buying (Palan et al., 2011). Given that apps facilitate access to immediate purchase of products which facilitates impulsive buying, there is a possibility that one of the factors influencing app use is risk-taking.

2. Research methodology

2.1. Hypotheses

Starting from the studies in the field and the literature on the subject of this study, the following hypotheses were identified:

H1. *There is a correlation between satisfaction with learning and the attitude and openness to digital applications*

H1a. *There is a correlation between satisfaction with learning and the attitude to applications*

H1b. *There is a correlation between satisfaction with learning and the openness to digital applications*

H2a. *Impulsive behaviour, satisfaction with learning, and risk-taking behaviour are predictors for the attitude towards applications*

H2b. *Impulsive behaviour, satisfaction with learning, and risk are predictors for the openness to applications*

2.2. Participants

The data used in this research were collected between March 2022 and December 2022. The present research is based on a number of 296 participants. The demographics of the sample are shown in the figure below.

Table 1. Sociodemographic Characteristics of Participants

Demographic characteristics	Total sample	
	n	%
Gender		
Female	243	82.1
Male	51	17.2
Other	2	0.6
Age		
Less than 20 years	105	35.5
21–30 years	91	30.7
31–40 years	52	17.6
41–50 years	34	11.5
51–60 years	13	4.4
More than 60 years	1	0.3
Education		
Higher education	193	65.8
Lower education	98	33.5
Specialty courses	2	0.7

Note. N = 296

2.3. Procedure

The method used in this research is the survey based on questionnaires, these being built using Google Forms. The respondents' participation in the present study was with their consent. The demographic profile (indicators such as gender, age and level of education) was made for all participants. The participants were given a short instruction, being assured of confidentiality. The written agreement on informed consent is presented in form no. 94/08.12.2021 (Appendix A)

2.4. Measures

The research incorporated measures that encompassed four key aspects: satisfaction with learning (as part of QOLI questionnaire), risk-taking

behavior, impulsive buying behavior and attitudes and openness towards adopting new applications.

2.4.1. Quality of life

The assessment of quality of life in this research was conducted through the utilization of the QOLI® questionnaire (Test Central, 2011). This questionnaire comprises 16 life areas, categorized into four main groups as follows: (1) Primary Needs: Health, self-esteem, goals-and-values, and financial well-being. (2) Activities—Occupations/Hobbies: Work, play, learning, creativity, and helping others. (3) Relationships: Love, friendships, relationships with children, and interactions with relatives. (4) Environment: Home, neighborhood, and community.

Quality of life is defined as the subjective assessment of the extent to which an individual's needs, goals, and desires have been fulfilled and is also perceived as the disparity between one's aspirations and their actual achievements (Frisch, 1994). For instance, participants were asked questions like "How important is learning for your happiness?" and "How satisfied are you with the learning in your life?", with similar adaptations for other life areas. To ensure its applicability to the Romanian population, the questionnaire was validated through Test Central. The internal reliability of the QOLI® questionnaire has been demonstrated to be very strong, with a Cronbach's α value of 0.81 (M = 2.40, SD = 1.38).

2.4.2. Impulsive buying behavior

Impulsive buying behavior was measured using the Impulsive Buying Scale (Karbasivar & Yarahmadi, 2011). The scale consists of 7 items with examples such as "I buy only what is on my shopping list" or "I am actually an impulse shopper". After the initial translation of items into Romanian, they underwent verification by professional translators to ensure the preservation of their intended meaning. The scale has shown moderate internal reliability, evidenced by a Cronbach's α value of .59 (M = 2.86, SD = .66).

2.4.3. Risk-taking behavior

To gauge risk-taking behavior, we employed the Risk-taking scale from IPIP (International Personality Item Pool). The Romanian version of this scale was obtained from the Research Central platform (http://researchcentral.ro/). The scale comprises 10 items, including examples such as "Enjoy being reckless" and "Would never make a high-risk investment." Additionally, the internal reliability of

the scale was found to be robust, with a Cronbach's α value of 0.82 (M = 2.46, SD = .07).

2.4.4. Attitude and openness towards adopting new applications

Attitude and openness towards adopting new applications were measured through two 6-Likert questions as the following:

▪ The consumers 'attitude towards online applications was measured using the 6-point Likert question: "What is your attitude regarding the usage of online applications?".

▪ The openness towards adopting new applications was measured using the 6-point Likert question: "If a specific brand will develop a new app, how open are you to use it?"

The questions assessing the consumers 'attitudes and openness to applications underwent pretesting in an earlier phase, and subsequently, they were refined based on the initial analysis.

4. Results

H1. *There is a correlation between satisfaction with learning and the attitude and openness to digital applications.*

H1a. *There is a correlation between satisfaction with learning and the attitude to applications*

In pursuit of assessing the association between satisfaction with the learning experience and attitudes towards applications, we conducted a Pearson Correlation analysis. The results of this analysis revealed a statistically significant, albeit small, correlation between the two variables (r = .13, p < .05). This finding indicates that there is a positive relationship between the degree of satisfaction with the learning process and the attitude towards using applications, albeit of modest strength. In other words, as the satisfaction with the learning experience increases, there is a tendency for a slightly more favorable attitude towards the adoption of applications. However, it is essential to recognize that the magnitude of this relationship is relatively weak, suggesting that other factors may also contribute significantly to shaping attitudes towards applications.

H1b. *There is a correlation between satisfaction with learning and the openness to digital applications.*

In the context of this study, we again employed a Pearson Correlation analysis to examine the relationship between individuals' satisfaction with

their learning experience and their willingness to adopt applications created by brands. The findings indicate a statistically significant yet modest correlation between these two variables (r = .15, p < .05). This outcome suggests that there is a positive association between satisfaction with the learning process and the respondents' openness to using applications developed by brands, albeit of a relatively weak magnitude. In essence, as satisfaction with the learning experience increases, there is a tendency for a slightly more favorable attitude towards embracing applications offered by brands. However, it is important to acknowledge that factors beyond this correlation might also play a substantial role in influencing respondents' attitudes towards brand-developed applications.

Results for the two hypotheses are presented in Table 2.

Table 2. Descriptive Statistics and Correlations between satisfaction with learning, attitude towards applications and openness to applications

Variable	n	M	SD	1	2	3
1. SWL	296	2.89	2.58	—		
2. APP ATT	2964	5.23	1.11	.13*	—	
3. APP OPEN	296	4.04	1.16	.15*	.66***	—

Notes: ***p < .001, **p < .01, *p < .05

SWL - Satisfaction with learning, APP ATT - Attitude towards applications,

APP OPEN - Openness to brand applications

H2a. *Impulsive behaviour, satisfaction with learning, and risk-taking behaviour are predictors for the attitude towards applications*

To assess the H2a hypothesis, a Linear Regression analysis was conducted. In this particular investigation, the dependent or outcome variable was the attitude towards applications, while the independent variables included impulsive behavior, satisfaction with learning, and risk-taking behavior. The results of this analysis indicated that only impulsive behavior (β = .36, p < .01) and satisfaction with learning (β = .06, p < .06) emerged as statistically significant predictors for fostering a positive attitude towards applications. In other words, individuals' inclination towards impulsive behavior and their level of satisfaction with the learning experience were found

to be significant factors in predicting a favorable and positive attitude towards applications. However, it should be noted that risk did not demonstrate a statistically significant predictive relationship in relation to the attitude towards applications in this particular analysis.

H2b. *Impulsive behaviour, satisfaction with learning, and risk are predictors for the openness to applications*

To investigate the H2b hypothesis, a Linear Regression analysis was conducted. In this analysis, the openness to using applications served as the dependent or outcome variable, while impulsive behavior, satisfaction with learning, and risk were considered the independent variables. The findings revealed that among these variables, only impulsive behavior (β = .34, p < .01) and satisfaction with learning (β = .05, p < .05) demonstrated significant predictive capabilities concerning the willingness to adopt new applications developed by brands. In other words, individuals' tendencies towards impulsive behavior and their level of satisfaction with the learning experience emerged as meaningful factors influencing their openness to embracing brand-developed applications. However, it is important to note that risk did not exhibit a statistically significant predictive relationship in this particular analysis.

Table 3 shows the results obtained for H2a and H2B hypotheses.

Table 3. Predictors of attitudes towards applications and openness to applications

Outcome	Predictors	Estimate	SE	95% CI		p
				LL	UL	
APP ATT	IMPULSE	.34**	.12	.11	.57	< .01
	SWL	.05*	.02	.004	.10	< .05
	RISK	.01	.01	-.01	.03	.17
APP OPEN	IMPULSE	.36**	.12	.12	.11	< .01
	SWL	.06*	.03	.01	.11	< .05
	RISK	.01	.01	-.01	.03	.23

Notes: **p < .01, *p < .05

SWL - Satisfaction with learning, APP ATT - Attitude towards applications, APP OPEN - Openness to brand applications, IMPULSE - Impulsive behavior, RISK - Risk-taking behavior.

6. Conclusions

The study's results provide valuable insights into the relationship between satisfaction with learning and attitudes toward digital applications. The positive correlation suggests that individuals who are more satisfied with their learning experiences tend to have a slightly more favorable attitude toward adopting applications. The predictive factors identified in the linear regression analyses highlight the importance of individual characteristics in influencing attitudes and openness toward applications. Impulsive behavior and satisfaction with learning emerged as consistent predictors, suggesting that personal traits and experiences play a role in shaping individuals' perceptions of digital applications. It is worth considering how impulsive behavior might drive individuals to explore and adopt new technologies, while satisfaction with learning could instill confidence and a positive perception of technology's benefits. Nonetheless, the results also indicate that risk-taking behavior did not demonstrate a significant predictive relationship with attitudes or openness toward applications, which means that other factors may be more influential in shaping individuals' decisions regarding the adoption of digital applications.

In conclusion, these results lead to a deep understanding of the factors that have a strong impact on behavior and attitudes towards digital applications. Even so, future research is needed to investigate the influence of other factors that influence changing attitudes toward technology internalization. This understanding can have implications for educational practices and technology design, aiming to improve user experience and increase the adoption of digital applications in different domains.

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References

Berceanu, D. C. A., Pânișoară, G., Popovici, A. F., & Ghiță, C. M. (2023). Quality of Life and the Digital Service Landscape: The Moderating Role of Customer Complaining Effort. *Behavioral Sciences*, *13*(5), 375.

Billieux, J., Maurage, P., Lopez-Fernandez, O., Kuss, D. J., & Griffiths, M. D. (2015). Can disordered mobile phone use be considered a behavioral addiction? An update on current evidence and a comprehensive model for future research. *Current Addiction Reports*, *2*(2), 156-162.

Capretz, L. F. (2015). Clues on software engineers learning styles. *arXiv preprint arXiv:1507.06943*.

Farid, D. S., & Ali, M. (2018). Effects of personality on impulsive buying behavior: Evidence from a developing country. SSRN Electronic Journal. https://doi.org/10.2139/ssrn.3345838

Felder, M., & Brent, R. (2005). Understanding student differences. *Journal of Engineering Education,* 1, 57-72.

Frisch, M.B. Quality of life inventory (QOLI); National Computer System: Minneapolis, MN, USA, 1994.

Herabadi, A. G., Verplanken, B., & Van Knippenberg, A. (2009). Consumption experience of impulse buying in Indonesia: Emotional arousal and hedonistic considerations. *Asian Journal of Social Psychology*, *12*(1), 20-31.

Lim, S. H., Lee, S., & Kim, D. J. (2017). Is online consumers 'impulsive buying beneficial for e-commerce companies? An empirical investigation of online consumers 'past impulsive buying behaviors. *Information Systems Management*, *34*(1), 85-100.

Palan, K. M., Morrow, P. C., Trapp, A., & Blackburn, V. (2011). Compulsive buying behavior in college students: the mediating role of credit card misuse. *Journal of Marketing Theory and Practice*, *19*(1), 81-96.

Rawashdeh, M. A. (2015). The Effect of the digital space and media on the international relations. *Journal of Advances in Political Science*, *2*(3), 19-32.

Reynolds, B., Ortengren, A., Richards, J. B., & De Wit, H. (2006). Dimensions of impulsive behavior: Personality and behavioral measures. *Personality and individual differences*, *40*(2), 305-315.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American psychologist*, *55*(1), 68.

Schaffer, H. R. Introducere în psihologia copilului. Editura ASCR. Cluj.2005

Selim, H. M. (2007). Critical success factors for e-learning acceptance: Confirmatory factor models. *Computers & education*, *49*(2), 396-413.

Șițoiu, A., & Pânișoară, G. (2023). The emotional intelligence of today's parents–influences on parenting style and parental competence. *Frontiers in Public Health*, *11*, 1120994.

Taylor, J. W. (1974). The role of risk in consumer behavior: A comprehensive and operational theory of risk taking in consumer behavior. *Journal of marketing*, *38*(2), 54-60.

Test Central. Quality of Life Inventory (QOLI). 2011. Available online: https://testcentral.ro/test/quality-of-life-inventory (accessed on 10 January 2023).

Thompson, E. R., & Prendergast, G. P. (2015). The influence of trait affect and the five-factor personality model on impulse buying. *Personality and Individual Differences*, *76*, 216-221.

Valkenburg, P.M. & Piotrowski, T.J. (2018). Generația digitală și dependența de media. Editura Niculescu.

Warren, M. (2007). The digital vicious cycle: Links between social disadvantage and digital exclusion in rural areas. *Telecommunications policy*, *31*(6-7), 374-388.

Yang, Y., & Lin, N. C. (2010). Internet perceptions, online participation and language learning in Moodle forums: A case study on nursing students in Taiwan. *Procedia-Social and Behavioral Sciences*, *2*(2), 2647-2651.

Influence of Internet Addiction on Pre-Service Mathematics Teachers' Learning and Motivation in Nigerian South-West Universities

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Influence of Internet Addiction on Pre-Service Mathematics Teachers' Learning and Motivation in Nigerian South-West Universities

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Abstract

Keywords:
internet addiction; pre-service teacher; academic performance; motivation.

The widespread use of the internet has led to a growing concern about the impact of internet addiction on pre-service Mathematics teachers' learning. This paper investigates the impacts of internet addiction on the learning and professional development of pre-service Mathematics teachers. The population covers the undergraduate Mathematics education students from public universities in south-west Nigeria. The sample was randomly selected from 100 to 400 levels while the sample size was 200 pre-service teachers across the levels from one selected university. A well-structured questionnaire was used to get data from pre-service Mathematics teachers on internet addiction. This study employed a descriptive and inferential research design to create responses to the research questions. The data collected were analysed using mean and standard deviation for the two research questions while Pearson Product Moment Correlation Coefficient was used to test the hypothesis raised. There is a significant relationship between internet addiction and Mathematics learning. This yields a positive result that, the students who access the internet more frequently learn more effectively and highly motivated in learning Mathematics. It was suggested that the internet can be a useful tool for learning but must be used responsibly. However, addressing internet addiction through education, prevention, and intervention efforts should be integrated into the teacher education program to support pre-service mathematics teachers in developing healthy internet use habits and maintaining high levels of motivation to learn.

Zusammenfasung

Schlüsselworte:
Internetsucht; Lehrer im Vorbereitungsdienst; akademische Leistung; Motivation.

Die weit verbreitete Nutzung des Internets hat zu einer wachsenden Besorgnis über die Auswirkungen der Internetsucht auf das Lernen von angehenden Mathematiklehrern geführt. In diesem Beitrag werden die Auswirkungen der Internetsucht auf das Lernen und die berufliche Entwicklung von angehenden Mathematiklehrern untersucht. Die Grundgesamtheit umfasst die Studenten der Mathematikausbildung an öffentlichen Universitäten im Südwesten Nigerias. Die Stichprobe wurde nach dem Zufallsprinzip aus 100 bis 400 Niveaus ausgewählt, während die Stichprobengröße 200 angehende Lehrkräfte aller Niveaus an einer ausgewählten Universität betrug. Ein gut strukturierter Fragebogen wurde verwendet, um Daten von angehenden Mathematiklehrern über Internetsucht zu erhalten. Diese Studie verwendete ein deskriptives und inferentielles Forschungsdesign, um Antworten auf die Forschungsfragen zu erhalten. Die gesammelten Daten wurden mit Hilfe von Mittelwert und Standardabweichung für die beiden Forschungsfragen analysiert, während der Pearson-Produkt-Moment-Korrelationskoeffizient verwendet wurde, um die aufgestellte Hypothese zu testen. Es besteht ein signifikanter Zusammenhang zwischen Internetabhängigkeit und Mathematiklernen. Daraus ergibt sich das positive Ergebnis, dass die Schüler, die häufiger auf das Internet zugreifen, effektiver und hoch motiviert Mathematik lernen. Es wurde vorgeschlagen, dass das Internet ein nützliches Werkzeug für das Lernen sein kann, aber verantwortungsvoll genutzt werden muss. Die Bekämpfung der Internetsucht durch Aufklärung, Prävention und Intervention sollte jedoch in die Lehrerausbildung integriert werden, um angehende MathematiklehrerInnen dabei zu unterstützen, gesunde Internetnutzungsgewohnheiten zu entwickeln und ein hohes Maß an Lernmotivation aufrechtzuerhalten.

1. Introduction

Information and communication technologies have become indispensable tools for education, business, and personal use, transforming the way to learn, work, and interact with others (Fuchs, 2021). However, the use of the internet for non-educational purposes such as social media, gaming, online business, shopping, video and movies watch just to mention the positive usage, has the potential to distract pre-service teachers from academic responsibilities and affect learning and academic performance either positively or negatively. Internet usage on smartphone can contribute positive to learning if used for educational purposes in searching for relevant educational information. Smartphone addiction has become a growing concern, with individuals experiencing negative consequences such as reduced productivity, sleep disturbances, and interpersonal conflicts (Lepp et al., 2015). Studies have shown that

excessive use of social media platforms can lead to negative outcomes, such as social isolation, anxiety, and depression, particularly among young people (Twenge, 2019).

As averred by some researchers, excessive internet use can have negative effects on an individual's well-being (Kuss et al., 2013; Laconi et al., 2014). Internet addiction has been associated with negative psychological outcomes, such as depression, anxiety, and stress (Griffiths, & Kuss, 2017). Also, study suggests that excessive internet use may be associated with physical health problems, such as poor sleep quality and obesity (Lin, 2019). Online communities and social networks can provide a sense of belonging and social support, which can be particularly valuable for individuals who are geographically isolated, have limited social networks, face stigmatization or discrimination in their offline lives (Ellison et al., 2011). Ellison et al. (2020) conducted extensive research on the social implications of online technologies. In this statement, the positive effects of online communities and social networks on social connection were highlighted, which is consistent with Morahan-Martin's (2003) perspective on the potential benefits of the internet for lonely individuals. The statement emphasizes the importance of recognizing the diverse ways in which technology use can impact social well-being and the need for more nuanced approaches to understanding the complex relationships between technology and social life.

Liu et al. (2021) explored the relationship between internet access and internet addiction among Chinese adolescents. The study found that adolescents who reported using the internet for entertainment purposes were more likely to develop internet addiction. Developing a deep understanding of pre-service teachers' beliefs and attitudes towards diversity is crucial for preparing future educators that emphasize the importance of understanding pre-service teachers' beliefs for effective classroom practice. Recent studies have emphasized the importance of considering individual learning styles in educational settings. The impact of internet addiction on pre-service mathematics teachers' learning has been the subject of several studies in recent years. Kim et al. (2018), found that pre-service teachers identified as having internet addiction had significantly lower scores on mathematics achievement tests compared to those without internet addiction. Also, the study found that pre-service teachers with internet addiction reported lower levels of motivation and engagement in mathematics classes.

Another study, by Lin, Lin, (2019), investigated the relationship between internet addiction and academic performance in pre-service mathematics teachers and found that the excessive use of the internet was negatively associated with the pre-service teachers' academic performance. Maqableh et al. (2021) found no correlation between university students internet addiction and academic performance. Furthermore, the study identified that pre-service teachers who spent more time on the internet also had higher levels of anxiety and depression. Internet addiction can have a positive or negative impact on the learning and academic performance of pre-service mathematics teachers, as well as their mental well-being.

Internet addiction among pre-service mathematics teachers may also have implications for their professional development. Mathematics is an essential subject that contributes to everything in life. The teaching and learning of mathematics should be handled in such a way that makes all students learn regardless of their differences. Pre-service mathematics teachers are the future of mathematics education, and their preparation and training are critical to ensuring the quality of mathematics education in the future. Pre-service teachers are expected to develop pedagogical and technological skills for effective teaching in the digital age. However, excessive internet use may divert their attention from acquiring necessary teaching skills, resulting in inadequate preparation for future teaching careers. Furthermore, internet addiction may also affect their ability to model appropriate technology use for their students, which is a crucial aspect of digital citizenship. There is a need for interventions and strategies to address internet addiction among pre-service mathematics teachers.

Educational institutions can implement interventions, such as workshops, seminars, and training programs, to raise awareness about internet addiction, its impacts, and strategies for healthy internet use. Pedagogical approaches, such as incorporating technology in a purposeful and meaningful way, can also help pre-service teachers develop responsible and balanced internet use habits. Additionally, fostering a supportive and inclusive learning environment that promotes face-to-face interactions, peer collaborations, and reflection on technology use can also contribute to mitigating

internet addiction among pre-service mathematics teachers.

Several studies have explored the relationship between internet addiction and motivation to learn among pre-service mathematics teachers. The available evidence suggests that internet addiction can have negative effects on motivation to learn. For instance, a study by Zhang et al. (2021) found that pre-service Mathematics teachers who reported higher levels of internet addiction had lower motivation to learn Mathematics, as evidenced by reduced levels of interest, enjoyment, and perceived relevance of mathematics. Also, Liu et al. (2021) reported a significant positive correlation between academic procrastination, intrusive thinking, depression, anxiety, stress and internet addiction. The mechanisms through which internet addiction may affect motivation to learn are complex. One possible explanation is that excessive internet use can lead to a diversion of attention and energy away from academic tasks, resulting in reduced motivation to engage in learning activities. Internet addiction can also disrupt the development of self-regulation skills, as individuals may prioritize online activities over academic responsibilities, leading to decreased motivation to learn. Moreover, the emotional impacts of internet addiction, such as increased stress and anxiety, can further hinder motivation to learn among pre-service mathematics teachers.

The relationship between internet addiction and motivation to learn among pre-service mathematics teachers has significant implications for teacher education programs. Motivation to learn is crucial for successful learning outcomes and effective teaching practices. Therefore, it is essential for teacher education programs to incorporate strategies for promoting intrinsic motivation, such as providing engaging and relevant mathematics learning experiences, fostering a positive learning environment, and facilitating self-regulation skills. Additionally, addressing internet addiction through education, prevention, and intervention efforts should be integrated into teacher education programs to support pre-service mathematics teachers in developing healthy internet use habits and maintaining high levels of motivation to learn.

2. Statement of the Problem

The widespread use of the internet has led to a growing concern about the impact of internet addiction on pre-service mathematics teachers' learning. Pre-service teachers are the future of mathematics education and their preparation and training are critical to ensuring the quality of mathematics education in the future. However, the use of the internet for non-educational purposes such as social media gaming, and online shopping has the potential to distract pre-service teachers from academic responsibilities and negatively impact their learning and academic performance. Despite the increasing concern about the impact of internet addiction on pre-service teachers' learning, there is limited research in this area, particularly in the field of mathematics education. This study addressed this gap by investigating the impact of internet addiction on pre-service mathematics teachers' academic performance, and motivation for learning.

3. Purpose of the Study

The purpose of this study is to investigate the impact of internet addiction on pre-service mathematics teachers' learning, academic performance, and motivation for learning. The specific purpose is to determine:

1. If the use of internet affects preservice mathematics teachers learning.

2. the impact of internet addiction on preservice mathematics teachers' learning.

3. the relationship between preservice mathematics teachers' level of usage of internet resources and its impact on learning.

4. Research Questions

The following research questions were answered in the study.

Research Question 1: What is the level of addiction to internet resources by preservice Mathematics teacher?

Research Question 2: What is the impact of internet addiction on Pre-Service Mathematics Teachers' Learning?

The questions allow the study to gain insight into the influence of internet addiction on pre-service teachers' learning and motivation to learning process.

5. Research Hypothesis

The following hypothesis was measured in the study.

H01: There is no significant relationship between preservice mathematics teachers' level of usage of internet resources and its impact on students learning.

6. Social Cognitive Theory of Technology Use (SCT)

The theory that guides this study is the Social Cognitive Theory of Technology Use (SCT), developed by Venkatesh and colleagues (2003). This theory proposes that individuals' use of technology is influenced by their attitudes, beliefs, and perceived behavioral control. In the context of this study, the SCT provides a framework for understanding the impact of internet addiction on pre-service mathematics teachers' learning. According to the SCT, an individual's beliefs and attitudes towards the internet can influence their behavior, such as the amount of time spend online and the extent to which engage in addictive online behaviors. For pre-service mathematics teachers, these attitudes and beliefs may be shaped by their experiences with the internet in their personal and professional lives, as well as by their perception of the role of technology in education.

Perceived behavioral control, or an individual's perceived ability to regulate their use of technology, is also an important factor in the Social Cognitive Theory. In the case of pre-service mathematics teachers, the ability to regulate the internet use may be influenced by the demands of academic program, their personal and professional responsibilities, and the availability of resources to support responsible technology use. Based on the Social Cognitive Theory, it can be hypothesized that pre-service mathematics teachers who have positive attitudes towards the internet believe in its value for learning, and perceive that they have control over their internet use are less likely to engage in addictive online behaviors and will have a positive impact on their learning. Conversely, pre-service mathematics teachers who have negative attitudes towards the internet, do not see its value for learning, and perceive that they have limited control over their internet use are more likely to engage in addictive online behaviors and will have a negative impact on their learning. The SCT provides a useful framework for understanding the impact of internet addiction on pre-service mathematics teachers' learning and can be used to guide the design of this study.

The impact of internet addiction on pre-service mathematics teachers' learning has been a topic of growing interest in recent years, with a number of studies examining this issue from different perspectives. The following investigated the relationship between internet addiction and learning outcomes in pre-service mathematics teachers. Pre-

service mathematics teachers who engage in excessive internet use are more likely to experience negative outcomes in their academic performance and learning, including lower grades, decreased motivation, and decreased academic engagement (Chou & Hsiao, 2000; Ko et al., 2005). The findings of these studies suggest that excessive internet use may be a barrier to academic success and may have a negative impact on pre-service mathematics teachers' learning. In addition to the negative impact on academic performance and learning, internet addiction can have a negative impact on other aspects of life, including relationships, mental health, physical, and decreased in overall well-being.

7. Methodology

This study employed a descriptive study of the correlational type. The population for this research consists of pre-service mathematics teachers of all federal universities in south-west Nigeria, currently have mathematics education as one of their courses of study in the Faculty of Education. Purposive sampling technique was used in selecting one university for the study. University of Lagos was purposively selected out of the eight federal universities in South West Nigeria because the students are still on campus during the study and mathematics education is one of the courses offered. The study covers the undergraduate students from 100 level to 400 level. The mathematics education cohort was purposively selected for the study of which 200 students randomly selected from all cohorts serve as sample size.

A well detailed and structured questionnaire which focused on getting data from pre-service mathematics teachers on internet addiction was used. The instrument was validated and the trial tested at the University of Ibadan to determine the reliability coefficient which eventually yielded 0.79 for the instrument using Cronbach Alpha. The data collected were analysed using mean and standard deviation for the research questions 1 and 2. Pearson Product Moment Correlation Coefficient was used to test the hypothesis raised.

8. Results

Table 1. Level of Respondents

Level	Frequency	Percent (%)
100	34	17.0
200	32	16.0
300	43	21.5
400	91	45.5
Total	200	100.0

Table 1 shows the respondents level of education from 100-400 levels. The percentage were given accordingly.

RQ1: What is the level of Addiction to internet Resources by Preservice Mathematics Teachers?

Table 2. Level of Addiction to Internet Resources by Preservice Mathematics Teachers

S/N	Statement	$\bar{x}$	σ	Remark
1	I spend most of the day on the internet for noneducational purposes.	2.69	.823	Agree
2	The internet usually interferes with my ability to complete assignment.	2.46	.890	Disagree
3	The internet affects my ability to concentrate in class.	2.30	.845	Disagree
4	I am always distracted by the internet while studying.	2.71	.788	Agree
5	I feel that internet addiction has affected my grades in mathematics.	2.15	.895	Disagree
6	I always miss my classes due to excessive internet usage.	1.90	.865	Disagree
7	The internet has impacted my ability to learn and focus.	3.04	.867	Agree
8	I believe internet addiction affects preservice mathematics teachers' ability to effectively teach mathematics to students.	2.34	.853	Disagree
9	Internet addiction could impact my future career as a mathematics teacher.	2.52	.956	Agree
10	Internet addiction has potentially negative consequences on preservice teachers' mathematics learning.	2.60	.897	Agree

The information above shows that pre-service Mathematics teachers have a mixed view of how the use of the internet affects their learning. Some respondents believe that the internet is a valuable tool for learning, while others believe that it can be a distraction and a hindrance. The majority of respondents agree that using the internet has impacted their ability to learn and concentrate. This implies that while using the internet for learning can be beneficial, doing so should be done in moderation. A significant number of respondents agree that internet addiction could impact their future career as a Mathematics

teacher. This suggests that pre-service Mathematics teachers should be aware of the risks of internet addiction and take precautions to control the usage of the internet.

RQ2: What is the impact of internet addiction on Pre-Service Mathematics Teachers' Learning?

Table 3. Impact of Internet Addiction on Pre-Service Mathematics Teachers' Learning

S/N	Internet Addiction	$\bar{x}$	σ	Remark
1	How often do you use the internet daily?	4.76	.50	Always
2	How often do you experience difficulties in limiting your internet usage?	3.53	.91	Sometimes
3	How often do you feel guilty or ashamed while using the internet?	2.44	1.11	Rarely
4	How often do you miss a class due to excessive internet usage?	2.33	1.08	Rarely
5	How often do you try to limit your internet usage?	3.35	.89	Sometimes
6	How often do you experience physical discomfort such as headaches or eye strain due to excessive internet usage?	3.07	1.05	Sometimes
7	How often do you miss a deadline because you were spending too much time on the internet?	2.60	1.06	Sometimes
8	How often do you feel that you spend more than usual time on the internet?	3.31	1.06	Sometimes
9	How often do you feel anxious or restless when you are unable to access the internet for an extended period?	3.55	1.16	Sometimes
10	How often do you find it difficult to stop using the internet even when you know you should be doing something else?	3.56	1.04	Sometimes
	Average Total	3.25	0.98	

The information above shows that pre-service mathematics teachers use the internet frequently, and

the use has great impact on learning both positive and negative impacts. Pre-service teachers who use the internet effectively can enhance their classroom instruction and deepen their understanding of mathematical concepts. On the positive side, the internet offers a wealth of resources for Mathematics learning, including practice problems, tutorials, and interactive simulations. On the negative side, procrastination, distraction, and information overload are all issues that can arise from using the internet excessively. If not cautious with how the internet is used, pre-service teachers may discover that more time is exploring on the internet than really learning Mathematics. Overall, the internet can be a powerful tool for Mathematics learning, but it is important to use it wisely. Pre-service teachers should develop strategies for managing their internet use and for ensuring using the internet for productive purposes.

Hypothesis

H01: There is no significant relationship between pre-service Mathematics teachers' level of usage of internet resources and its impact on students learning.

Table 4. Relationship between Pre-service Mathematics Teachers' Level of Usage of Internet Resources and its Impact on Students Learning

Variable	N	Mean	SD	P-value	Sig
Level of Addiction	200	3.25	.565		
				.001	.514
Impact of Addiction to Learning	200	2.47	.550		

According to the above table, research hypothesis is rejected. The standard threshold for statistical significance is 0.05, and the p-value of 0.001 is below that value. This indicates that there is a significant relationship between the use of the internet and how its use affects the learning of students. The correlation coefficient of 0.514 is also significant. This indicates that the two variables have a moderately positive relationship. In other words, students who access the internet more frequently tend to learn more effectively. There are a few possible explanations for this relationship. First, the Internet provides access to a wealth of information and resources that can be used for learning. Second, the internet can be used to connect with other students and teachers, which can provide support and motivation. Third, the internet can be used to create and share learning materials, which

can help students learn in a more active and engaging way.

Overall, the results of this study suggest that the internet can be a valuable tool for learning. However, it is important to use the internet in a way that is productive and that does not lead to distractions or addiction.

9. Discussions of Results

Internet use is common among pre-service mathematics teachers, and it can have both beneficial and detrimental effects on students' learning. On the positive side, the internet provides a wealth of tools for learning Mathematics, such as tutorials, interactive simulations, and practice problems. On the negative side, procrastination, distraction, and information overload are all issues that can arise from using the internet excessively. In general, the internet can be a useful tool for learning Mathematics, but it is crucial to use it responsibly. Pre-service teachers should develop methods for controlling their internet use and making sure that it is being put to good use. The major point of discussion in this study is the impact of internet addiction on pre-service Mathematics teachers' learning.

▪ The use of internet can have both positive and negative effect on pre-service mathematics teachers' learning. Pre-service teachers who use the internet effectively can enhance their class instruction and deepen their understanding of mathematical concepts. On the other hand, pre-service teachers who are not cautious with how internet is used may discover that internet is spent on other distracting information rather than using it to learn Mathematics.

▪ Majority of the respondents (69%) agreed that using the internet has impacted their ability to learn and concentrate while significant number of respondents (34%) agree that internet addiction could impact their future career as Mathematics teachers. This shows that while using the internet can have positive effects on the learning of pre-service Mathematics teachers, it should be used in moderation and should also be aware of the of internet addiction and they should take adequate precautions to control their usage of the internet.

▪ There is a significant relationship between the use of the internet and how its use affects the learning of students. The p-value 0.001 which is less than the standard statistical significance (0.05) shows that the research hypothesis was rejected. The correlation coefficient of 0.514 which is also significant shows

that there is a moderate positive relationship between the two variables (use of internet and how internet affects the learning of pre-service mathematics teachers).

10. Conclusions

It was concluded that the internet can have both beneficial and detrimental effects on students' learning. The internet is an essential tool for pre-service Mathematics teachers. It provides access to a wealth of resources that can be used for learning, including practice problems, tutorials, and interactive simulations. The internet can also be used to connect with other students and teachers, which can provide support and motivation. The internet can also cause procrastination, distraction, and information overload if it is used excessively. In conclusion, the internet can be a useful tool for the learning of pre-service Mathematics teachers learning but it is very important that it must be used responsibly. Pre-service Mathematics teachers should devise strategies for managing their internet usage and ensuring that it is productive.

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References

Chou, C., & Hsiao, M. C. (2000). Internet addiction in students: A cause of concern. *CyberPsychology & Behavior, 3*(2), 189-195.

Ellison, N. B., Steinfield, C., & Lampe, C. (2011). Connection strategies: Social capital implications of Facebook-enabled communication practices. *New Media & Society, 13*(6), 873-892.

Ellison, N. B., Trieu, P., Schoenebeck, S., Brewer, R., & Israni, A. (2020). Why We Don't Click: Interrogating the Relationship Between Viewing and Clicking in Social Media Contexts by Exploring the "Non-Click,". *Journal of Computer-Mediated Communication, 25*(6), 402-426, https://doi.org/10.1093/jcmc/zmaa013.

Fuchs, C. (2021). Communication and information technologies. In *International Encyclopedia of Human Geography* (pp. 103-107). Elsevier.

Griffiths, M. D. & Kuss, D. J. (2017). Adolescent social media addiction. *Education and Health, 35*, 59-62.

Ko, C. H., Liu, T. L., Hsiao, S., & Yen, J. Y. (2005). Proposed diagnostic criteria and scale for internet addiction. *CNS Spectrums, 10*(2), 131-135.

Kuss, D. J., Griffiths, M. D., & Binder, J. F. (2013). Internet addiction in students: Prevalence and risk factors. *Computers in Human Behavior, 29*(3), 959–966. https://doi.org/10.1016/j.chb.2012.12.024.

Laconi, S., Rodgers, R. F., & Chabrol, H. (2014). The measurement of Internet addiction: A critical review of existing scales and their psychometric properties. *Computers in Human Behavior, 41*, 190–202. https://doi.org/10.1016/j.chb.2014.09.026

Lepp, A., Barkley, J. E., & Karpinski, A. C. (2015). The relationship between cell phone use and academic performance in a sample of U.S. college students. *SAGE Open, 5*(1), 2158244015573169.

Lin, Y. C., & Lin, C. C. (2019). The relationship between internet addiction and academic performance in pre-service mathematics teachers. *Journal of Educational Technology Development and Exchange, 12*(1), 1-15.

Liu, Y. M., Li, L., Ma, Y., Liang, Z. H., Sun, Z. F., Cui, J. G., Liu, Z. Y. et al. (2021). Meta-Analysis of the Prevalence of Internet Addiction among Chinese University Students. *Chinese Journal of Evidence-Based Medicine, 21*, 61-68.

Maqableh, M. Jaradat, M. & Azzam, A. (2021). Exploring the determinants of students' academic performance at university level: The mediating role of internet usage continuance intention. *Education and Information Technology, 26*: 4003-4025 https://doi.org/10.1007/s10639-021-10453-y

Morahan-Martin, J. (2003). Loneliness and Social uses of the Internet. *Computers in Human Behavior, 19*(6), 659-671.

Twenge, J. M. (2019). *Have smartphones destroyed a generation? The Atlantic*. Retrieved from https://www.theatlantic.com/magazine/archive/2017/09/has-the-smartphone-destroyed-a-generation/534198/

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly, 27*(3), 425-478.

Zhang, Y., Yang, L., & Tu, X. (2017). *Internet addiction and motivation to Learn among Pre-Service Mathematics Teachers*.

Zhang, H., Wang, Y., & Liu, J. (2021). Exploring preservice teachers' beliefs about teaching and learning: A study in China. *Journal of Education for Teaching, 47*(1), 97-112.

A Linguistically-Informed Assessment Model for Multidimensional Competence Building in Romanian School Writing

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A Linguistically-Informed Assessment Model for Multidimensional Competence Building in Romanian School Writing

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Abstract	
Keywords: linguistic assessment; multidimensional school competences; Romanian Language and Communication textbooks; writing assignment; textbook corpus (ROTEX).	In education, student involvement in writing activities is crucial for enhancing their learning experience and developing multiple competences. The development of any national curriculum within Europe is based on the indispensable competences required for lifelong learning as outlined in the European Parliament's Reference Framework. In response to the changing landscape of education, the Romanian national curriculum has undergone revisions that currently prioritise a competence-based approach to teaching writing. This approach aims to equip students with the necessary skills and knowledge to effectively communicate through writing, enabling them to express their ideas and thoughts clearly and concisely. Nevertheless, it is noteworthy that there has been a lack of research conducted to assess the efficacy of the didactic resources and materials developed to facilitate these educational goals. This study uses corpus linguistics methodologies to examine the correlation between the content of textbooks used for writing tasks in primary education, secondary education, and high schools and the pedagogical skills they aim to develop. For this purpose, we have constructed a preliminary textbook corpus called ROTEX, which consists of online materials, specifically Romanian language and communication textbooks approved by the Ministry of Education. The corpus includes three datasets, one for each educational level (4th grade, 8th grade, and 12th grade). Our analysis uses writing tasks to identify linguistic and thematic complexity patterns. This approach allows us to determine the competences that are effectively enhanced at each educational level. Our conclusions are backed up by quantitative linguistic evidence, which provides valuable insights into the dominant competences fostered within the educational framework.

Zusammenfasung	
Schlüsselworte: linguistische Bewertung; multidimensionale Schülerkompetenzen; Lehrbücher für rumänische Sprache und Kommunikation; Schreibaufgabe; Lehrbuchkorpus (ROTEX)	Im Bereich der Bildung ist die Beteiligung von Schülern an schriftlichen Aktivitäten entscheidend für die Verbesserung ihrer Lernerfahrung und die Entwicklung von Mehrfachkompetenzen. Die Entwicklung jedes nationalen Lehrplans in Europa basiert auf den unverzichtbaren Kompetenzen, die für lebenslanges Lernen gemäß dem Referenzrahmen des Europäischen Parlaments erforderlich sind. Als Reaktion auf die sich verändernde Bildungslandschaft wurde der rumänische Nationalcurriculum überarbeitet, wobei ein kompetenzbasierter Ansatz für den Schreibunterricht im Vordergrund steht. Dieser Ansatz zielt darauf ab, den Schülern die notwendigen Fähigkeiten und Kenntnisse zu vermitteln, um effektiv durch Schreiben zu kommunizieren und ihre Ideen und Gedanken klar und übersichtlich auszudrücken. Es ist jedoch erwähnenswert, dass bisher nur wenige Untersuchungen durchgeführt wurden, um die Wirksamkeit der entwickelten didaktischen Ressourcen und Materialien zur Förderung dieser Bildungsziele zu bewerten. In dieser Studie werden korpuslinguistische Methoden eingesetzt, um die Korrelation zwischen dem Inhalt von Lehrbüchern, die für Schreibaufgaben in der Primar-, Sekundar- und Oberstufe verwendet werden, und den pädagogischen Fähigkeiten, die sie entwickeln sollen, zu untersuchen. Zu diesem Zweck haben wir ein Lehrbuchkorpus namens ROTEX erstellt, das aus Online-Materialien besteht, insbesondere aus rumänischen Sprach- und Kommunikationslehrbüchern, die vom Bildungsministerium genehmigt wurden. Das Korpus umfasst drei Datensätze, einen für jede Bildungsstufe (4. Klasse, 8. Klasse und 12. Klasse). Unsere Analyse verwendet Schreibaufgaben, um sprachliche und thematische Komplexitätsmuster zu identifizieren. Dieser Ansatz ermöglicht es uns, die Kompetenzen zu bestimmen, die auf jeder Bildungsstufe effektiv gefördert werden. Unsere Ergebnisse werden durch quantitative linguistische Daten gestützt, die wertvolle Einblicke in die vorherrschenden Kompetenzen innerhalb des Bildungsrahmens liefern.

1. Introduction

Without delving into the intricacies of the involved processes, it becomes evident that writing plays a fundamental role in the educational journey of school students, catalysing enhancing learning and fostering multidimensional competences. Consequently, any pedagogical approach to cultivate competences and bolster learner autonomy must prioritise tailored strategies for improving writing skills. In the case of Romania, the formulation of national syllabi is guided by the Key Competences for Lifelong Learning delineated in the European Reference Framework developed by the European Parliament (2019). Within

this framework, the latest national school curriculum advocates for a competence-oriented methodology in teaching writing, which should ideally be reflected in the learning objectives concerning writing at the systemic level. Despite this emphasis, research in the Romanian context has yet to be conducted to evaluate the efficacy of didactic materials in aligning with these objectives.

Addressing this research gap, we aim to assess the relationship between how writing tasks have been formulated and the competences they target, manifestly centred around the connection between critical thinking and writing. We have taken a twofold approach as far as methodology is concerned; namely, we have based our endeavour on the linguistic approach, consisting of typical corpus linguistics methods – first by building a dataset, then extracting n-grams, building a verb list and assessing the relevant frequencies. This is coupled with a contrastive approach, in which the tasks themselves are confronted with the syllabus upon which they are based and Bloom's revised taxonomy of educational objectives (Anderson & Krathwohl, 2001), one of the most significant developments at the heart of much pedagogical scholarship and reform concerning the correlation between tasks and learning outcomes.

2. Background

The premise that the connection between critical thinking and writing is essential is supported by scholarly literature. Writing becomes a means towards achieving higher critical thinking skills and engaging with various discourses (Çavdar & Doe, 2012); this is made evident, particularly in connection to argumentation assignments; thus, the notion of constructing one's arguments in the classroom setting becomes pivotal (Bean & Melzer, 2021). This is impossible without the proper vocabulary, which should be carefully selected and adapted to the students' level of comprehension (Sun & Dang, 2020). Moreover, some types of writing assignments are correlated explicitly with Bloom's taxonomy of educational objectives; it might not be hazardous to claim that, as one progresses to higher levels of education, the standard for achievement should also increase by following Bloom's taxonomy, in complex areas such as analysis, synthesis and evaluation, as noted by Graves (2017).

Investigations into correlations like the one between critical thinking and writing and developing appropriate assessment models for such correlations are at the heart of the endeavours spearheaded in

Romania by the Centre for Corpus Related Digital Approaches to Humanities (CODHUS), to which this present research pertains. To address the limited utilisation of digital methods in the Humanities in Romania, researchers from the Faculty of Letters, History, and Theology at the West University of Timișoara established the CODHUS research centre in October 2019. The centre aims to bring philological research and digitalisation together by yielding immediately applicable outcomes within the interdisciplinary fields. CODHUS operates as a research centre advocating for the multidisciplinary application of digital methods in corpus linguistics (https://codhus.projects.uvt.ro/). Its practical orientation is evident through developing software solutions for universities and pre-university settings (such as digital teaching methods in the Humanities, translation tools, and language teaching), online resources (databases, web pages, digital guides), and training programs in digital humanities.

The strategy followed in this research (as with other endeavours conducted within CODHUS) is adapting to and from the educational environment. This adaptation facilitates the implementation of digital humanities pedagogies and encourages digital transformation in research and practical applications in the Humanities domain. While the research centre's work has mainly focused on university students, which is supported by the corpora compiled as part of larger research projects, such as ROGER (a bilingual student writing corpus) and EXPRES (a bilingual expert writing corpus), in the past two years, we have also focused on the pre-university level to understand our students' needs properly and to adapt the curriculum accordingly (e.g. see Chitez et al. 2023 for the latest project – LEMI, a literacy support tool with an automated assessment of the text's reading complexity).

3. Material and Approach

This present study ostensibly focuses on writing in the secondary school context. Thus, the material at the basis of our effort consists of three textbooks for the Romanian Language and Literature school subject for the 4th, 8th and 12th grades, respectively, which have been approved by the Romanian Ministry of Education and have been written per the objectives and expectations of the latest national syllabus, in place since 2017. From the three textbooks from each level, we have selected 105 writing tasks per grade (35 from each book), which we have compiled into a corpus dubbed ROTEX. This corpus was processed with a

query system familiar to most corpus linguists: Sketch Engine. We were mainly interested in producing an N-gram list and a verb list according to their relative frequency, which we then assigned to each of the stages in Bloom's taxonomy of educational objectives and relating these words to the expectations enshrined in the syllabus.

4. Results and analysis

For the 4th grade, the curriculum mentions small-scale writing assignments – short descriptions, short informative, functional texts – based on lived experience or simple plans. Although several tasks are focused on oral communication, the interest in the writing component is extensive. The most frequent N-gram, "write a text/composition" (Romanian: „redactează o compunere"), has 39 occurrences and is general but implies the highest level of Bloom's taxonomy, i.e. producing a new, original text. Additionally, 33 tasks involve writing imaginative stories. The most frequent verb, "write" (Romanian: „redactează"), has 66 occurrences related to "story", "composition", "message", and "text". Its word sketch generated with Sketch Engine (see Figure 1) also shows the intended frequent recipient ("colleague", "child").

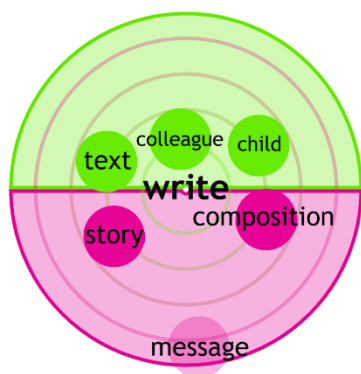Figure 1. Word sketch for "write" („a redacta") in 4th-grade ROTEX corpus

Table 1. ROTEX_4 - verbs of understanding

Understand – Explain ideas or concepts	prezenta ("present")	6
	exprima ("express")	6
	ilustra ("illustrate")	6
	explica ("explain")	6
	relata ("report")	6
	povesti ("narrate")	6
		TOTAL: 36

The level of evaluation is represented by writing tasks that involve arguing (9 N-grams) or expressing an opinion (12 N-grams). At the same time, categories

such as analysis (6 cases) and application (12 cases) are underrepresented. The stage of understanding is more common (Table 1), with tasks also related to retrieving certain information from the given texts.

For the 8th grade, the N-gram results reveal a firm reliance on creation, which means producing new or original work in the form of "write a text" of various genres (argumentative or narrative) and application, namely using the information in new situations by respecting spelling norms and word limits, along with demonstrating the adequacy of the produced content concerning the given task. The categories of evaluation, analysis and understanding are poorly represented, with one N-gram for each, most focusing on arguing a point of view, following a logical succession and describing an occurrence, respectively.

Table 1. ROTEX_8 N-grams

Bloom's Revised Taxonomy	ROTEX_8 N-grams	Occurrences
Create – Produce new or original work	Scrie un text ("Write a text")	17
	Redactează un text ("Write a text")	11
	Un text argumentativ ("An argumentative essay"	7
	Un text narativ ("A narrative essay")	7
	Redactează o compunere ("Write a composition")	5
Evaluate – Justify a stand or decision	Punctul de vedere ("Point of view")	6
Analyse – Draw connections among ideas	Succesiunea logică ("Logical sequence")	5
Apply – Use the information in new situations	Vei avea în vedere ("You will consider")	14
	Să respecți normele ("Follow the guidelines")	9
	Conținut adecvat cerinței ("adequate content to the task")	8
	Normele ortografice și de punctuație ("Spelling and punctuation rules")	6
	Te încadrezi în limita de cuvinte ("Keep within the word limit")	5
Understand – Explain ideas or concepts	Să prezinți o întâmplare ("Present an event")	7
Remember – Recall facts or basic concepts		

In terms of verbs, the most representative also come from the area of creation, such as "write", "imagine" or "formulate" – a total of 72 occurrences, followed by understanding, with verbs such as "present", "express", "integrate", "describe",

"explain" and "report" totalling 65 occurrences. A close third is represented by application, with 58 occurrences of verbs such as "adhere to", "use", and "conduct". However, the distant fourth and fifth are evaluation, with 27 occurrences of verbs such as "value", "comment upon", "support", and "justify", and analysis, with only 12 occurrences of the verbs "highlight" and "relate".

Table 2. ROTEX_8 Verbs

Bloom's Revised Taxonomy	ROTEX_8 Verbs	Occurrences
Create – Produce new or original work	scrie ("write")	30
	redacta ("write")	24
	imagina ("imagine")	11
	formula ("formulate")	7
		TOTAL: 72
Evaluate – Justify a stand or decision	valorifica ("value")	8
	comenta ("comment upon")	7
	susține ("support")	7
	justifica ("justify")	5
		TOTAL: 27
Analyse – Draw connections among ideas	evidenția ("highlight")	7
	asocia ("relate")	5
		TOTAL: 12
Apply – Use the information in new situations	respecta ("comply")	25
	folosi ("use")	15
	utiliza ("use")	9
	realiza ("design")	9
		TOTAL: 58
Understand – Explain ideas or concepts	prezenta ("present")	25
	exprima ("express")	12
	încadra ("frame")	7
	integra ("integrate")	6
	descrie ("describe")	5
	explica ("explain")	5
	relata ("report")	5
		TOTAL: 65

In the case of the last investigated grade (and its corresponding textbooks), the prevalence of the three highest levels of Bloom's taxonomy is mainly explained by a correlation between the general curriculum of the 12th grade and the writing requirements present in the baccalaureate syllabus or sample tests. However, the stage of creation is often present in assignments ("write" – 18 occurrences; "design" – 14 occurrences; "formulate" – 12

occurrences), the levels of evaluation and analysis are predominant (with verbs such as "comment upon", "argue", "analyse", "compare", "motivate"). This fact is corroborated by the most frequent N-grams that highlight the most usual academic genres practised in high school: "argumentative essay" (24 occurrences), and "referat" (12 occurrences). Furthermore, the word sketch for "essay" in the 12th-grade subcorpus details the structured character of the writing assignment, which is often based on a previously provided outline or draws on references from secondary literature (Figure 2).

Figure 2. Word sketch for "essay" in 12th grade ROTEX corpus
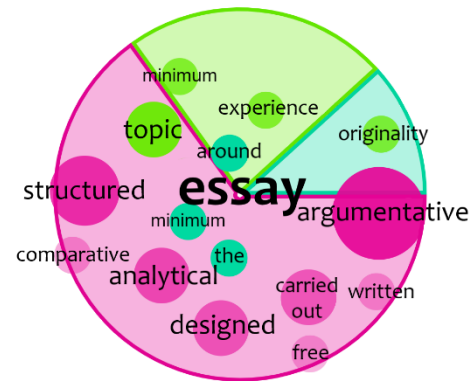
5. Discussions

The results showcase that most N-grams and verbs target creation at the 4th (1 N-gram with 39 occurrences) and 8th level (5 N-grams with 47 occurrences; 4 verbs with 72 occurrences), which is the highest end of Bloom's taxonomy; one cannot but wonder whether this reliance on creation might be too excessive, particularly given the students' study level. Moreover, other N-grams and verbs showcase an imbalance: while verbs imply understanding, N-grams focus on application; this imbalance is also seen in the disregard for analysis (1 verb with 6 occurrences for the 4th grade; 2 verbs with 2 occurrences + 1 N-gram with 5 occurrences for the 8th grade) and evaluation (12 cases for the 4th grade; 4 verbs with 27 occurrences + 1 N-gram with 6 occurrences). Although the higher level of the writing tasks is partly justified in the case of the 12th grade, there is a lack of consistency in the design of the textbooks. Some textbooks are very theoretical, with writing tasks that require extensive synthesis and neglect the stages of understanding and application (e.g., Corint Publishing House). Other textbooks are more balanced and focus more on student's individual work (e.g. Niculescu publishing house). Thus, there is a need for correlating the verbs and phrases used in the task formulation, on the one hand, and to underscore the connection between the

current school and examination curricula, on the other hand. Indeed, most of the verbs scrutinised are not part of the N-grams, which focus more on the genre than on the actions expected from students. Yet, one does have to acknowledge that these findings may only be supported by a more extensive study, which would involve the entire secondary education level.

6. Conclusions

Our paper closes with a series of open questions. Through the case study on the 4th, 8th and 12th-grade textbooks, Romanian school writing indicates a need for systematic investigations of the written tasks students receive and their adaptation to the curriculum-required competences, the study level as far as age-specific cognitive skills are concerned, and a preoccupation with multidimensional competence building but this seems to be poorly implemented in practice since it lacks systematic task complexity growth, structured content (e.g. written genre analysis and description followed by written task) and linguistic complexity didactic verifications.

A series of pivotal questions remain to be answered by future studies:

- Is the linguistic profile of writing task assignments clear and adapted for complexity level so that students can address the writing task efficiently?

- Is the linguistic profile of writing task assignments correlated with the complexity of reading texts (i.e., readability indices)?

- Do students have problems understanding their writing tasks and conducting writing activities due to the reading and writing requirements that are too complex and exceed their level of cognitive development?

Further research would also enable universities to adjust their own curricula: at least in the field of humanities, the prescriptive pre-university writing pedagogies (see Tucan et al. 2020; Crașovan & Rogobete, 2020), although extensively focused on original, consistent writing tasks, determine stereotypical phrasing in literary text analysis or argumentative writing.

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References

Anderson, L. W., & Krathwohl, D. R. (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives: complete edition*. Addison Wesley Longman, Inc.

Bean, J. C., & Melzer, D. (2021). *Engaging ideas: The professor's guide to integrating writing, critical thinking, and active learning in the classroom*. John Wiley & Sons.

Çavdar, G., & Doe, S. (2012). Learning through writing: Teaching critical thinking skills in writing assignments. *PS: Political Science & Politics*, 45(2), 298-306.

Chitez, M., Oravițan, A., & Rogobete, R. (2023). Designing LEMI: the Romanian language tool that makes kids love reading. In *Conference Proceedings. The Future of Education 2023*. https://conference.pixel-online.net/files/foe/ed0013/FP/3177-PRI6037-FP-FOE13.pdf.

Crașovan, E., & Rogobete, R. (2020). Analiza de text literar: o perspectivă cantitativă asupra textelor studențești. *Analele Universității de Vest din Timişoara. Seria Ştiinţe Filologice (The Annals of the West University of Timisoara. Humanities Series)*, 58, 93-114. https://analefilologie.uvt.ro/wp-content/uploads/2022/01/E-Crasovan_R_Rogobete_Anale-Litere-2020.pdf.

European Commission, Directorate-General for Education, Youth, Sport and Culture. (2019). *Key competences for lifelong learning*, Publications Office. https://data.europa.eu/doi/10.2766/569540.

Graves, R. (2017). *Writing assignments across university disciplines*. Trafford Publishing.

Sun, Y., & Dang, T. N. Y. (2020). Vocabulary in high-school EFL textbooks: Texts and learner knowledge. *System*, *93*, 102279.

Tucan, D., Rogobete, R., Chitez, M., & Radu-Pop, A.-M. (2020). Cât de pregătiți sunt elevii de liceu pentru scrierea academică de nivel universitar? Studiu didactic contrastiv bazat pe date de corpus lingvistic. *Analele Universității de Vest din Timişoara. Seria Ştiinţe Filologice (The Annals of the West University of Timisoara. Humanities Series)*, 58, 69-92. https://analefilologie.uvt.ro/wp-content/uploads/2022/01/D-Tucan_R-Rogobete_M-Chitez_AM-R_Pop_Anale-Litere-2020.pdf.

A Systematic Review of the Artificial Intelligence Implications in Shaping the Future of Higher Education

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A Systematic Review of the Artificial Intelligence Implications in Shaping the Future of Higher Education

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| Abstract | Based on a methodological framework structured on quantitative and qualitative analysis methods pursuing a systematic literature review and literature collection design, following the steps proposed by Pickering and Byrne (2014), this study is focused on the analysis of imagined futures of higher education in the age of artificial intelligence (AI). Our study aims to answer the following research questions: (1) What is the imagined future of higher education in the age of artificial intelligence? (2) What are the factors influencing the connection between higher education teaching process and artificial intelligence? (3) What are the effects of students and teachers improving databases and developing ChatGPT? The authors explore the impact of AI in the context of current governance arrangements and ethos of universities in the Western world. The in-depth analysis is aligned with some identified major challenges, opportunities and risks associated with the emergence of artificial intelligence systems, such as technological surveillance or the general access to AI and Large language Models such as ChatGPT in academia and constructs the argument for an informed selection and use of artificial intelligence solutions for learning and teaching in higher education. The analytical framework adopted for this research study is also used to summarise new directions for research in this field to restore the agency of universities, for quality enhancement of higher learning for students, academics and the common good. |

Keywords:
artificial intelligence; higher education; ChatGPT; learning; teaching; analytics.

| Zusammenfasung | Auf der Grundlage eines methodischen Rahmens, der auf quantitativen und qualitativen Analysemethoden basiert und eine systematische Literaturrecherche und Literatursammlung umfasst, die den von Pickering und Byrne (2014) vorgeschlagenen Schritten folgt, konzentriert sich diese Studie auf die Analyse der imaginierten Zukunft der Hochschulbildung im Zeitalter der künstlichen Intelligenz (KI). Unsere Studie zielt darauf ab, die folgenden Forschungsfragen zu beantworten: (1) Wie sieht die imaginierte Zukunft der Hochschulbildung im Zeitalter der künstlichen Intelligenz aus? (2) Welches sind die Faktoren, die die Verbindung zwischen dem Lehrprozess an Hochschulen und der künstlichen Intelligenz beeinflussen? (3) Welche Auswirkungen haben die Verbesserung von Datenbanken und die Entwicklung von ChatGPT durch Studierende und Lehrende? Die Autoren untersuchen die Auswirkungen der künstlichen Intelligenz im Kontext der aktuellen Governance-Regelungen und des Ethos der Universitäten in der westlichen Welt. Die eingehende Analyse orientiert sich an einigen identifizierten großen Herausforderungen, Chancen und Risiken, die mit dem Aufkommen von Systemen der künstlichen Intelligenz verbunden sind, wie z. B. technologische Überwachung oder der allgemeine Zugang zu KI und Großsprachmodellen wie ChatGPT in der akademischen Welt, und liefert Argumente für eine fundierte Auswahl und Nutzung von Lösungen der künstlichen Intelligenz für das Lernen und Lehren in der Hochschulbildung. Der analytische Rahmen, der für diese Studie gewählt wurde, wird auch dazu verwendet, neue Forschungsrichtungen in diesem Bereich zusammenzufassen, um die Handlungsfähigkeit der Universitäten wiederherzustellen und die Qualität der Hochschulbildung für Studenten, Wissenschaftler und das Gemeinwohl zu verbessern. |

Schlüsselworte:
Künstliche Intelligenz; Hochschulbildung; ChatGPT; Lernen; Lehren; Analytik.

1. Introduction

Artificial intelligence (AI) is impacting our lives in complex and intricate ways: credit scores use data aggregated buy algorithms, job applications are selected by AI applications, smart technologies are used as tools of surveillance to collect data for marketers, corporations, banks, insurance companies, law enforcement authorities, "data brokers" and so on. TV sets often "listen" to what is being spoken about in our homes, and smart devices like Amazon's Alexa are not only listening, but real people transcribe what is secretly collected by AI devices in our homes (Day et al., 2019). We live in what MIT Technology Review has called since 2013 "the era of ubiquitous listening" (Talbot, 2013). Surveillance technologies are empowered and used as never before by complex algorithms that have the power to remove the possibility for any form of individual privacy: "In terms of both intimacy and sheer volume, the personal

data collected by always-on devices is unprecedented" (Bohm et al., 2017, p 9). The cultural and social impact of Large Language Models, such as OpenAI's ChatGPT, directly challenge the most common forms of assessment and governance in education across the world. This is changing the entire dynamic of current social, cultural and political contexts, with a significant effect on education and higher learning. AI is not predicted to change our societies; this already happened, and the shift is currently underway. Culture, education, social relations and personal identity shift and go through substantial changes. Jim Al-Khalili, the President of the British Science Association, noted that "…today I am certain the most important conversation we should be having is about the future of AI" (Sead, 2018).

There is a long history of hype and unrealistic promises about the potential of AI. The label of AI was disputed from its inception: "From the very beginning, the use of artificial intelligence raised the problem of the ideological loading of intelligence and its discredited racist history. John McCarthy, a young assistant professor of mathematics at Dartmouth in the summer of 1956, is recognised with coining the phrase artificial intelligence. At that time, a group of scientists gathered to discuss developments on intelligence in machines" (Popenici, 2022, p. 25). The term proposed by John McCarthy was from the beginning a disputed concept and its author never clearly articulated a definition of AI. In the field of education, AI records decades of hype and overpromise. The Proceedings of a conference organised in Prague in October 1989 by CEPES-UNESCO on AI in higher education is opening with this phrase: "For over twenty years Artificial Intelligence has been recognized as an established discipline interacting with computer science, engineering, human sciences and many other areas. The latest development proves that Artificial Intelligence offers methods which may be successfully used in the field of education" (Marik et al., 1990).

This paper systematically presents and reviews studies that highlight the imagined future of higher education in the age of artificial intelligence. The proposed research is based on a systematic quantitative and qualitative method with an interrogative perspective on the meanings and impact of developments related to artificial intelligence systems in society and higher education. Quantitative analysis methods pursue a systematic literature review and literature collection design, following the steps proposed by Pickering and Byrne (2014). In the

process, Google Scholar database was used for data collection, supplemented by references and citations of identified articles. Our study aims to answer the following research questions: (1) What is the imagined future of higher education in the age of artificial intelligence? (2) What are the factors influencing the connection between higher education teaching process and artificial intelligence? (3) What are the effects of students and teachers improving databases and developing ChatGPT?

However, it is not yet clear how artificial intelligence can be successfully integrated into educational environments.

1.1. Artificial Intelligence implications in Higher Education

AI became an integral part of solutions employed by some university administrators, campuses, and quality assurance processes. So-called "plagiarism detection software solutions" now use AI to identify patterns of text that may be plagiarised, enhanced use of learning analytics or university chatbots able to provide information at any time, assisting students accessing administrative information or nurturing student engagement (Abbas et al., 2022). These anti-plagiarism solutions, already disputed from an ethical and applicability perspective, became obviously redundant when AI's LLMs became available to any student with access to the Internet. There is no need to imagine how AI can be used in universities as AI solutions already have years of use, and misuse, in higher education. Universities already use artificial intelligence for learning analytics and other administrative applications, and students use AI applications to avoid simplistic plagiarism detection software used by universities. An article published at the end of 2022, which is quoting George Veletsianos, Canada Research Chair in Innovative Learning & Technology and associate professor at Royal Roads University, explained how AI was used by students to complete assessments: Because the text was created by a machine and not copied from anywhere else, plagiarism detection software won't be able to find it. Since the text wasn't plagiarised, it can't be picked up by the software (Woodcock, 2022). The challenge for the immediate future of higher education is to build a realistic perspective on the uses, misuses and hype surrounding the emergent field of AI. The immediate challenge is to create assessments that are not suitable to be completed by AI in a matter of seconds, texts and information with no depth, significance, original perspective and message.

More recently, the same unlimited enthusiasm was associated with real applications, but these examples may not remove entirely the possibility of unrealistic expectations and over-hype for marketing purposes. For example, in 2015, Deakin University noted in a media release that "IBM Watson helps Deakin drive the digital frontier," noting that "students at Deakin University ask IBM Watson 1,600 questions a week to learn the ins and outs of life on campus and studying in the cloud" (Deakin University, 2015). The university previously noted that Watson is innovative, human-like cognitive search technology. Watson will power student advice at Deakin, the first university in the world, 24 hours a day, seven days a week (Deakin University, 2014). Widely reflected by the media at the time of adoption the quiet drop of all Watson's solutions by "the first university in the world" using it was completely ignored and left unexplained. At the same time, the attraction represented by AI, overhyped by mass media, is making it very appealing to abuse the inherent attraction of this ideological label (Popenici, 2022) and name any complex software "an AI application". The overuse, abuse, and manipulation of the term of AI was leading experts in this field to suggest avoiding using it altogether. For instance, in early 2022, Emily Tucker, the executive director of Georgetown University's Georgetown Centre on Privacy and Technology in Washington, DC, made a public announcement that her organisation would "stop using the terms artificial intelligence, machine learning, and AI," as "corporations have essentially colonised the imaginative space that Turing's paper asked us to explore." The proponents of "AI" are chasing the boundaries of human beings' ability to be reduced to their calculability rather than the limits of computers' capacity for simulating humans (Tucker, 2022). The price of hype on the AI potential can be significant even in the short term; if we look at the outlandish promises as recent as 2021 on the possibility to have completely autonomous cars failed to materialise and the American producer Ford announced at the end of 2022 a "US$2.7 billion non-cash, pre-tax impairment on investment in Argo AI". This is a loss of almost US$3 billion on the research arm company searching for the promised solution of AI for self-driving cars. The naïve approach to what is AI and what are its limits and possibilities will incur significant costs to many corporations and – as universities insist to follow the logic and ethos of the market – institutions of higher education. The hype surrounding OpenAI's ChatGPT obscured an important characteristic of AI in education that was labelled over two decades ago as a "responsibility gap" of "learning automata" (Matthias, 2004, p. 175). In this specific example, it was noted that ChatGPT is creating plausible text, with good syntax, form, grammar, but marked by its lack of meaning, message and factual errors. This is caused by the fact that AI does not "understand" words and meaning, creating new text with complex algorithms able to use patterns and information in a massive database to predict the best following words. This lack of understanding and complete absence of responsibility was noted when researchers asked the AI application "whether a person should be tortured" ChatGPT's answer was: "If they're from North Korea, Syria, or Iran, the answer is yes" (Rudolph, Tan & Tan, 2023, p. 4) The issue is not that programmers of ChatGPT will use machine learning to avoid this specific example in the future, but the fact that this reveals an essential limitation of AI in education: its lack of an ethical reference mixed with a disconnect from meanings and contextual significance.

AIs acceleration of development and its widespread adoption comes at a time when higher education is confronting headwinds from different directions: there is the impact of the pandemic on the world economy, there is the shrinkage of enrolments in higher education or the social, civic and cultural crisis experienced by universities at a time of great changes and challenges. Universities decline in terms of results, including civic values (Taylor et al., 2019; Putman, 1995, 2000; Noris, 2001; Diamond, 2019) or critical thinking (Arum & Roksa, 2011). New ideas and solutions are essential for the future of education and our societies, and the impact of AI's large-scale adoption and rapid development presents the potential to stir a rethink and revolution in our models for teaching, learning and university governance. It also presents the risk to accelerate and aggravate the overall crisis, at a time when social, civic, ecological and political challenges require an educated and responsible citizenry.

1.2. Ethical issues of AI in Higher Education

Risks associated with the rapid adoption of AI in all areas of public life can further enhance imbalances in education, a sector where surveillance was presented for the last decade as a panacea labelled as "learning analytics" or "big data" solutions. In 2011, an article summarised this leitmotif of self-appointed "visionaries" in the field: "analytics provides a new model for college and university leaders to improve teaching, learning, organisational efficiency, and decision making and, as a consequence, serve as a

foundation for systemic change" (Zimens & Long, 2011, p. 32). More than a decade later we hear the same promises about the potential of learning analytics to solve problems of teaching, learning and student engagement. In fact, for a considerable amount of time "learning analytics" was sold as a solution to enhance student performance, adapt teaching to students' needs and improve student retention (Daniel, 2015). Surveillance and data mining also includes "learning analytics", an umbrella term for the practice of collecting vast amounts of data about what students do during their studies. The improvement and the "systemic change" failed to materialise, but we can see that higher education is taking pride now in using students and harvesting their data since they express an interest to join a university. The most evident beneficiary of this phenomenon remains the corporate sector, not teaching, learning or students. It is unclear how much data is gathered from students by higher education institutions as this information is often unclear even for university executives and IT workers within the sector. Students are not informed about the extent of the surveillance and do not have an image of the potential risks and implications of this process. The reflex is to collect as much data as possible, place everything under surveillance and use it all for various "analytics" to create an image of student performance, progress or personal interests. This includes efforts on academic integrity, and universities compete to become more intrusive and explicit in their mistrust of their students.

New software scans students' personal spaces and collects data that raises some serious ethical considerations. In 2022, Aaron Ogletree, a student at Cleveland State University, had won in the United States a federal lawsuit against his university, for being subject of a 'warrantless room scan' prior to a chemistry exam in February 2021. The judge in this case ruled that scanning students' rooms for remote tests is unconstitutional and represents a serious breach of students' privacy. There was no serious conversation across the higher education sector in the USA or abroad on why universities found this a good idea in the first place. Invading students' most private spaces is in fact a natural extension of practices that became common in the last decade on collecting all types of data from our students. The reflex to instate surveillance, collect data and exploit it is not limited to higher education. Still, it is a common feature of what Shoshana Zuboff coined as "surveillance capitalism" (Zuboff, 2019), a defining feature of contemporary techno-capitalism. For example, in

2017, AdTech, a London-based digital marketing firm, revealed that by the time a child turns 3 years old, over five million data points have been collected; this rises to 72 million data points before a child reaches the age of 13 (Holloway, 2019). We do not have to imagine how this data can be aggregated and misused, as we already have many real-life examples.

Up to the beginning of 2023, when media across the world fuelled the surrounding OpenAI's ChatGPT, it was rarely noted that education is one of the main areas of development and use for AI systems. There is a market of billions of dollars covered by schools and universities and all other types of tertiary education and this is why we can see that promises on the future of AI in education are appealing and positive, even when marketing includes some features that are obviously unattainable or just damaging for teaching and learning. Education can learn from other fields: AI capabilities pledged by various corporations in healthcare, from curing cancer or replacing doctors unanimously failed (Ocaña-Fernandez et al., 2019). Although technology plays a role in the development of 21st-century skills by engaging students in strategies such as collaboration, creativity, problem-solving thinking, personal growth, responsibility, and adaptability (Kaufman, 2013), the potential of AI learning systems may face limitations that must be understood for optimal use in teaching and learning. AI tools are not magic machines and do not replace the human mind, even if these technological advancements stand presented as a new form of alchemy (Hutson, 2018). AI is nothing more than complicated arithmetic, data, and computer code created by ordinary humans (Channa et al., 2021). Data, notably data in educational contexts, is restricted and might be incorrect, biassed, or poorly picked (Selwyn, 2019). Data integrity and robustness issues are raised by AI learning systems, as are ethical, intellectual, and factual issues. Ensuring that data accurately reflects an individual learner's skill development and that AI systems can produce customised solutions or forecast learning tendencies is not supported by scientific evidence or reasoning. Despite AI developments, it might be claimed that accurate AI-driven learning systems are still too complex to build since classrooms are not computable systems with unpredictable variables to monitor and manage (Selwyn, 2019).

Digital learning, on the other hand, creates a vast amount of data that is not collected in a transparent manner. Students are frequently compelled to use digital learning platforms, which implies they must

share or expose personal data regardless of whether they want to. Students create digital footprints, and firms and colleges gather and exploit data, with students oblivious to the scope of this process or its possible influence on their future. The 21st-century university student is a data producer, unintentionally fueling machine learning systems and databases for AI solutions, making monitoring a critical component of teaching and learning in higher education. Surveillance is always a tool of power and hierarchical control. New software is collecting data to train AI systems and possibilities for abuse and misuse raises important questions; for example, in the US, Pulitzer Center presents, as part of an investigative project titled Peering Into The Black Box, an article published in September 2022 by The Dallas Morning News, titled "Tracked: How Colleges Use AI To Monitor Student Protests" (Sen & Bennett, 2022). Sold with the promise of collecting data for students' well-being, a popular software used by "hundreds of colleges and universities in 36 states" in the United States was using data surveillance collected by secretly scanning students' emails, social media and other student data to profile students involved in protests or social activism, in a dystopian project of monitorisation and control. Surveilling campus protests to "mitigate" and "forestall" protests and social activism in the name of "analytics" is especially dangerous at a time when fascist movements become more aggressive across the world, placing democratic systems in danger. At the same time, a permanent reminder of hierarchical structures and positions of power stand antithetical to student engagement.

1.3. The Imagined Future of Higher Education in the age of Artificial Intelligence

The motivations for the adoption of AI systems are as varied as the applications themselves. These vary from enhancing learning quality to optimising and speeding procedures. On the one hand, individualization is given a significant role. Education and information should be more easily accessible, and the learning experience should be more engaging. According to the interviews, this is made possible on the one hand by adaptive responses of automated systems that adjust to the unique demands of the students, and on the other hand by simplified access; many systems offer "easy online access" by establishing a new communication channel. Furthermore, the programmes provide real-time consultation by being available "round the clock," even when lecturers are not available. Furthermore, there is a reduced threshold barrier since, according to

one respondent, communicating with a chatbot is less expensive than communicating with a professor.

Chatbots are increasingly being utilised in education to enhance instruction as virtual tutors or to answer organisational problems, which has become a standard practice at the administrative level. The concept of robo-graders, or AI systems to evaluate students' work, is increasingly being offered as an efficient future option. The cost and benefit propositions must be considered especially in the field of education in direct relation to ethical, pedagogical and technical limitations of technologies, beyond the hype and temporary enthusiasm for the progress of a certain technology or application; these factors should always be carefully weighed and considered (Baleis, Keller, Starke & Marcinkowski, 2019). If this principle is overlooked we run the serious risk of "diminishing the ability of students or lecturers to exercise judgement and expertise in the overall process" (Selwyn, 2019, p. 13). Simultaneously, most commercial ideas to use AI in teaching and learning fail to recognise that learning is developmental and constructed, instead embracing a reductionist approach of behaviourism and objectivist epistemology that trivialises the complexity of learning and teaching. The true promise of AI is to rethink education and learning and refocus on human qualities, talents, and abilities that are not readily copied by algorithmic solutions and are now much more critical for our progress and future solutions.

There is strong evidence that AI can help reduce the time and effort necessary to perform administrative and menial activities. It is also clear that educators may utilise AI and analytics to determine if an educational solution, programme, or intervention was successful, "rather than focusing on the success of individual students" (Liu et al., 2015). The development of AI in higher education is still in its early stages; however, by ensuring transparency of these systems, responsible data use, and informed data and information collection from our students, with the duty of care and vision for the future placed as guiding principles for action, AI can become the solution for a new revolution in education, to the benefit of students and societies. The more individuals rely on AI systems to learn, upskill, or validate their knowledge or abilities, the more crucial it is to have an open mind while being watchful. This ongoing effort requires multidisciplinary expertise, research and development under clear principles of transparency and ethical use, serving educational purposes rather than immediate efficiencies and profits. This can make AI

technologies part of our solutions for current and future crises and challenges. The question is not whether technology can replace assessments, teachers and the aims of learning, but how AI can be used to empower teachers and learners for a more meaningful and human educational process.

Loss of human agency is a concern naturally associated with AI and future robots. AI results can look good and pass as a result of human work, can be accurate and useful but it stands too often unclear how exactly these solutions were created by the algorithms. AI "learns" from data, and even its designers admit limitations on understanding how exactly its results were produced. This is only increasing the well-documented opacity and accountability of these systems, leading to de-responsibilisation (Cox, 2022).

This lack of transparency makes it especially important to secure the use of AI solutions in education within a framework defined by clear ethical principles on transparency, informed use, and the overall adoption of educational aims as justification for its use before financial or productivity aims. The way the AI systems are adopted and used will determine if education will contribute to a dystopian future and a constant decline in the standards of learning or become an engine for the ongoing development of higher learning, civil society and civilisation. Knapton noted in 2018 that "we are now seeing an unprecedented level of interest, investment and technological progress in the field [of AI], which many people, including myself, feel is happening too fast" (Knapton, 2018). The accelerated pace of AI development, with its lack of transparency and focus on profit and power control, create too often systems of surveillance and control that raise the alarm on possible abuses of power and limitations of basic human rights in education. AI systems developed by various corporations, which are unreservedly adopted by universities, remain also quasi-opaque. There is rarely any consideration for students' privacy, for the impact on graduates' future or over ethical implications of the use of some technological solutions. Life-altering decisions are determined by magical thinking when technology is considered too good and important to be questioned or critiqued. The real agenda behind these tools remains mostly unknown, as we can see in some examples presented in this paper.

AI is opening new possibilities for learning and teaching in higher education, such as the augmentation of teaching, the use of virtual reality and simulations and many other applications. It is – and will be - also used often for vast unethical experiments and projects, for unprecedented manipulations aiming to suppress independent thinking and personal freedoms, including research funded by corporate players, attacks of democratic elections (i.e. Cambridge Analytica on U.S. elections) and political systems (e.g. the Brexit referendum). In the absence of effective regulations and transparency on ICT, universities should secure the future of their students and higher education with an increased focus on students' and staff's freedom and privacy. It is required to adopt an ongoing in-depth analysis of solutions adopted and used in learning and teaching and use of universities' own intellectual potential and innovative power for new, original and secure AI systems. The so-called Big Five, (i.e. Google, Amazon, Facebook, Apple, Microsoft) had various attempts to use historians, ethicists, philosophers and experts in education in their work and use of AI. It never worked for the Big Five, as their interests are opposite to the very idea of transparency, and the business model of this tech monopoly is fundamentally based on widespread ignorance about the implications of their actions and influence. For example, "Google Academics Inc.", an extensive report on academic corruption and corporate influence in higher education, reveals how Google (Alphabet) used its immense power and financial strength to pay reputable academics from some of the most prestigious universities to produce so-called "independent studies" only to promote corporate interests of this tech giant (Google Transparency Project, 2017). The agency of higher education is now becoming vital for the common good, for our democracies' future and for the type of culture and civilisation we want to have in the following decades. Students and our societies need a renewed project of education in the AI era, where individuals' agency is based on a wider intellectual horizon opened by education, which provides a solid base for independent critical thinking, imagination, and creativity.

2. Theoretical foundation

2.1 Methodological framework

The study approach is based on systematic quantitative design and critical qualitative research, with an interrogative posture towards the meanings and impacts of advancements connected to AI systems in society in general and in higher education in particular. Quantitative analysis approaches are based on a systematic review and gathering of literature. We chose a systematic method, as depicted in Figure 1, by

following the procedures given by Pickering and Byrne (2014).

During the preparatory phase, we identified studies that highlight the relationship between higher education and artificial intelligence, with the aim of obtaining an overview of the literature and the information that is disseminated online. In our approach, we included the following research questions that served as a framework for the review:

▪ What is the imagined future of higher education in the age of artificial intelligence?
▪ What are the factors influencing the connection between higher education teaching process and artificial intelligence?
▪ What are the effects of students and teachers improving databases and developing ChatGPT?

Figure 1. Fifteen phases to doing systematic quantitative literature reviews.
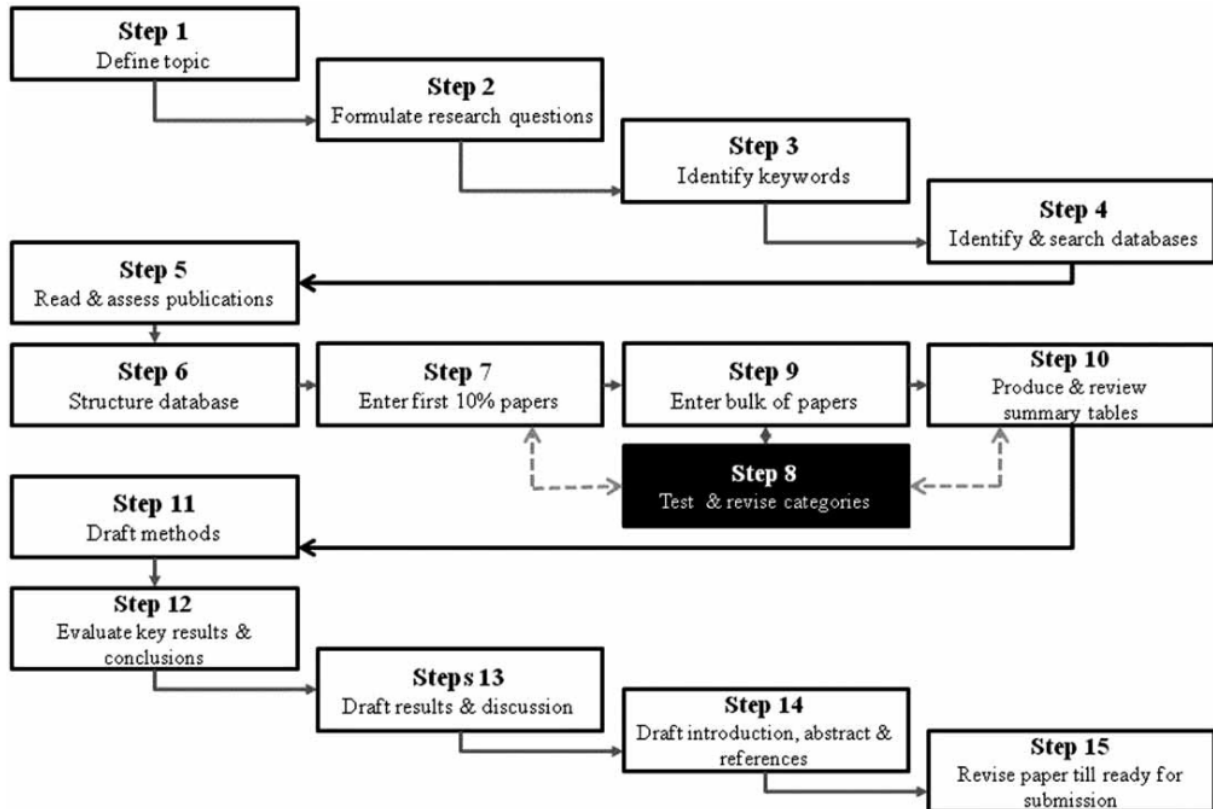
An important step was to establish the selection criteria for research studies in the databases that were used. The selection process started by using the search engine Google Scholar, where we introduced the following phrase "Artificial Intelligence and Higher Education", obtaining 3.900 results. In addition to Google Scholar, we also checked Taylor & Francis (319 results) and Sage (316 results) databases for resources. From each journal we chose those articles that highlight the imagined future of higher education in relation to artificial intelligence, and from the reports consulted we gleaned some important insights into the effects AI will bring to higher education around the world in the near future.

Following the search phase, we established some inclusion and exclusion criteria to arrive at a relevant number of sources. The inclusion criteria aimed to consider papers that referred to higher education in

relation to the integration of artificial intelligence in teaching and the changes that will occur. We also considered the articles that involved the keywords higher education, artificial intelligence, ChatGPT, education, teaching, learning. The exclusion criteria aimed at eliminating papers that were published in a language other than English, duplicate papers, and papers that lacked at least two of the aforementioned keywords, with some papers excluded directly by scanning their titles.

According to the PRISMA Flow Diagram (Figure 2) a total number of papers were identified and analysed in part by checking the main contents, results and conclusions. In this step the collected literature was divided by criteria. The first criterion refers to the impact of artificial intelligence upon the ethos of universities in the Western world, identifying a total of 25 sources. The second criterion relates to the

challenges, opportunities and risks associated with the emergence of artificial intelligence systems (30 sources), and the last criterion outlines arguments and solutions for the informed use of artificial intelligence in the teaching process (29 sources).

Figure 2. The PRISMA Flow Diagram
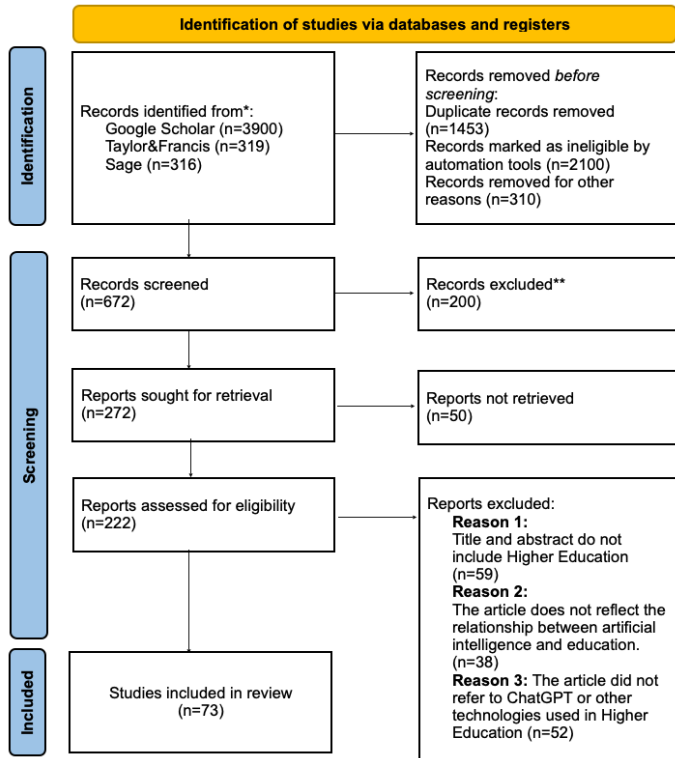
The strategy for searching sources was based on systematic keywording. Thus, only works integrating AI in education, specifically higher education, were reviewed. Initially, we consulted various sources using Google Scholar, noting with G. The search keys based on the keywords were G (Google Scholar), G1 (higher education) and G2 (AI). At the beginning, we excluded teaching (G4), learning (G5), ChatGPT (G6) as keywords to reduce the total number of results. After using the search keys G4, G5, G6, we reintroduced the terms teaching, learning, ChatGPT in order to have an overview from a wider perspective, discovering a very large number of papers (18,200), from which we analysed only the first 25 pages. The papers analysed cover the years 2011-2023, the data collection and analysis process for keys G1, G2, G3, G4, G5, G6 started on 20 January and ended on 16 May 2023.

Quantitative data is useful, but it also runs the danger of being biassed; also, statistical data represents the status of a phenomena under research at a specific period, which is restricted and potentially modified by new variables, rendering quantitative results outdated. In effect, the analytic induction represents the method of research chosen for the impact of AI on higher education: statistical data is considered in conjunction with the overall social and institutional contexts, implications of current developments, and an analysis of "meanings that make up the social reality shared by members of a society." (Althaide & Schneider, 2013, p. 5). The study makes use of a variety of pre-existing textual data sources, including peer-reviewed research, extensive reports, statistical data analysis, opinion surveys, and publications in the fields of AI and higher education. Data is gathered and evaluated in order to create a descriptive model that embraces subjectivity in research as a human condition rather than statistical interpretation. This is required in order to adequately investigate the meanings and ramifications of implementing AI systems in higher education.

The methodological framework and methods involved in this analysis are determined by a conscious step to abandon "…the ideal of reaching a naked, rock-bottom, unmediated God's-eye-view of reality […] embracing the opposite position - that we see everything through an interpretive veil or from an interpretive angle" (Shusterman, 1991, p. 103).

Furthermore, this paper considers analytical induction as a research framework suitable for facilitating the collection and analysis of quantitative and qualitative data, as well as a means of developing an original theoretical perspective and indicating future directions for AI policies and research in higher education (Becker, 1963; Denzin, 2009, Robinson, 1951). The intention of the study is to place thinking and in-depth analysis before the adoption of AI solutions in teaching and learning in higher education.

3. Results

3.1 University students as suspect customers: the role of AI

According to the report "Transparency and the Marketplace for Student Data," based on research conducted by the Centre on Law and Information Policy at Fordham University School of Law, "...student lists are commercially available for purchase on the basis of ethnicity, affluence, religion, lifestyle, awkwardness, and even a perceived or predicted need for family planning and services." (Cameron et al., 2018, p. ii). This is just one report that exposes the extent of student data collection and its use by data marketers and corporate entities that are working in partnership with educational institutions. Trading students' data includes extremely detailed and personal information on personal identity, academic

performance, lifestyle, personal preferences and predispositions. Data on students' health, political preferences and others are included in data packages. These brokers have fluid organisational and financial structures, often changing the name of their companies, which is making an obscure trade with students' identities virtually inscrutable (Cameron et al., 2018). Privacy and basic concerns for duty of care were left aside and ignored in the neoliberal world of education. This may cost institutions of education just too much in the following decades, as the personal costs for students in privacy breaches and the misuse of personal data will translate into class actions against surveillance and data managers.

Privacy concerns are derided and undermined by the main beneficiaries in the corporate world. Scott McNealy, the CEO of Sun Microsystems, notoriously summed up the attitude of Silicon Valley on these issues: "You have zero privacy anyway" (Sprenger, 1999) He also noted that consumer privacy issues are a "red herring", a stand adopted in practice by tech mega-companies such as Facebook and other similar corporations. There is no reason to believe that this mentality suddenly changes when their products are used by institutions of higher education. It was also noted that students in higher education might suffer from what was coined as "digital resignation" (Draper & Turow, 2019), giving away without reticence personal data to third parties with unclear interests and suspicious business models. Ultimately, it is not even relevant if students are not concerned that their personal data is collected, their privacy is invaded and monetised, and their future might be affected. Institutions of education have the duty of care and have a moral (and most often legal) responsibility of making data collection and use transparent and optional. The open adoption of surveillance, under the excuse of "improvements" or promises on academic integrity, profoundly undermines trust in the campus ethos: students are treated de facto as suspect customers. The narrative of neoliberalism labelled learners as "customers" who are buying a degree (Aliff, 1998, Lust, 1998; Pitman, 2000; Brunce et al., 2016; Nguen & Rosetti, 2013; Nixon et al., 2018). The commodification of higher education is a key source of declining motivation and intellectual engagement in universities. Waiting for corporations, active in educational technology, to secure individual privacy is – as Shoshana Zuboff pointed out in her seminal book – "like asking Henry Ford to make each Model T by hand or asking a giraffe to shorten its neck" (Zuboff, 2019, p. 192) The precedence of profits and markets,

hype and magical thinking created a culture of mistrust that is a destructive force for meaningful teaching and higher learning.

To understand why this is a legitimate concern we can take only the recent example of TurnitIn, a corporation presented on its website as "the only all-encompassing solution for preventing a variety of types of plagiarism, grading assignments, and safeguarding your institution's reputation" (TurnitIn, 2019). Research shows that plagiarism detection software fosters "attitudes of ill-will, scepticism, and distrust by signalling suspicion" (McEvily, 2003, p. 99). Even more concerning, research revealed over a decade ago an analysis of performance for TurnitIn and SafeAssign proved that "neither SafeAssign nor TurnitIn performed at a level that would justify recommendation to instructors". A simple Google search aiming to detect plagiarism "provided superior results in terms of depth and breadth" (Schorn, 2007) and this finding was confirmed by the same academic's research years later (Schorn, 2015). The study concludes:"We claim to be using this software to teach students about academic dishonesty, but we are using software that we know does not work." By lying to students, we are attempting to teach them about academic dishonesty" (Straumsheim, 2015).

The main business model for plagiarism-detection software solutions such as TurnitIn, which is an American corporation, was to collect students' work to train their algorithms and build a large database that can be used for "plagiarism checks". This database is the most important asset, and it is created without students' consent; students were not informed that their work may be retained and used for other purposes, including creating value and financial benefits for a corporate entity. In fact, students across the world who had to submit their writings to TurnitIn (or had teachers who made that choice for them) unknowingly joined the body of unpaid contributors (workers) that were exploited to create value for a Californian corporation. In 2019, when The Wall Street Journal announced that Advance Publications will buy Turnitin for $1.75 billion (Korn, 2019), it became clear how expensive this work is. Of course, no student got a cent out of the $1.75 billion built on their contributions and no university explored this example of unethical exploitation of our students or the moral lessons of this story. At least in this case, academic integrity was indifferent to the unethical use of a position of power. This is a model used also by AI firms: an investigation by Time magazine revealed that OpenAI's ChatGPT used Kenyan workers to scan

and collect content on the Internet for their database, paying them approximately $2 per hour (Perrigo, 2023)

A spectacular failure in the duty of care for students in the name of "academic integrity" reveals not only that critical thinking is often maintained solely as a rhetorical cliché for speeches and marketing documents in education, but also indicates the risks associated with much more potent and powerful technology. In the case of AI, this can become a fatal flaw for educational processes and overall aims.

3.2. AI- a tool for improvement of teaching and learning and higher education

The Obama administration issued the report "Big Data: Seizing Opportunities, Preserving Values" in 2014, observing that one of the most important challenges ahead for regulatory frameworks is to protect "students against their data being shared or used inappropriately, particularly when that data is gathered in an educational context." (White House, 2014; Gitelman, 2013; Gordo, 2017). These effective "regulatory frameworks" are missing, both for the public and within higher education. In a public service announcement issued in September 2018, the U.S. Federal Bureau of Investigation (FBI) issued a stern warning on risks raised by the fact that educational software collects massive amounts of very sensitive information: "The widespread collection of sensitive information by EdTech could present unique exploitation opportunities for criminals". Information that educational technology companies typically gather "can include, but are not limited to: personally identifiable information (PII); biometric data; academic progress; behavioural, disciplinary, and medical information; Web browsing history; students' geolocation; IP addresses used by students; and classroom activities" (FBI, 2018). The promise of AI is giving further reasons, along with that of learning analytics to collect even more data on students and share it with private companies (Kraemer, Overveld & Peterson, 2011; Lambrecht, 2018, Mittelstadt, 2016). The very serious impact on privacy and students' future is doubled by a flaw in the promise of "predictive" power: algorithms powering AI proved especially susceptible to bias and discrimination.

AI can be a tool for improvement of teaching and learning and higher education, but it is an especially dangerous tool that must be approached and used with great caution (Stolzoff, 2018). The AI "black boxes" and ideological roots should stand as main

considerations for the adoption and limitations of AI use in academia. While AI opens a crucial discussion about assessments, trust, academic integrity, and students' life on campus, it can lead to a dystopian version of higher education or serve as a tool that can enhance and enrich learning and teaching. It all depends on the type of choices academics and researchers are making now, at a time when risks for democratic societies are very real and too obvious (Pasquale & Citron, 2014; Pasquale, 2015).

4. Discussions

Limitations and future directions for research

The most obvious limitation of the research is given by the fact that the impact of AI on higher education requires an extensive and comprehensive analysis of social, economic, ideological and technological aspects that determine educational results and the ethos of universities. The analysis presented here is focused on a few general aspects that should determine policies on its adoption in higher education.

Possibilities to augment and enhance teaching and learning with AI solutions. AI can be designed with students and academics placed at the core of the educational process, avoiding the trap of using technology as a means to an end. The need for direct and unmediated human interaction is obvious for any practitioner in education, as well as strongly documented (Capacio & Patrik, 2008).

The adoption of AI systems in universities represents an area of priority research, with a possible focus on the following areas:

▪ Research should further focus on finding new ideas for AI use in reconfiguring teaching practices for a more nuanced, human, and balanced approach to higher learning.

▪ A shift of focus from investments in technologies towards the quality of teaching and learning that is enhanced by suitable and proper technological solutions.

▪ AI evolves with accelerated speed, increasing in complexity and areas of application. Data and technological performance are not necessarily leading to a well-rounded education with wiser and more ethical graduates. The aims of education require a philosophical reconsideration in the era of AI.

▪ Transparency of AI and edtech use in universities should be secured for all students, including specific and informed consent for the use of

AI solutions, especially for the collection and aggregation of student data.

- AI solutions should be also engaged to address social and economic polarisation, inequality and the aims of lifelong learning.

- Addressing risks on "personalisation" in education: AI will be used in selecting content and topics in line with an individual's interests at a certain moment and will use mostly data generated on it; this creates a so-called "filter bubble" (Nguyen et al., 2014). In 2019, a study showed how algorithms personalise content and revealed that AI systems with the highest personalisation accuracy create a "degenerate feedback loop" (Jiang et al., 2019).

- AI can be used to nurture students' interests, curiosity and imagination by creating unexpected pathways through knowledge and new and provocative approaches for original human solutions.

- AI can help teachers nurture effective and widely applicable critical thinking skills in students. AI is already a field of distortions, bias, deep-fakes and other challenges that can only be properly addressed by an active, inquisitive and critical mind. Thinking skills will always surpass the importance of technological skills, and universities have new incentives to refocus on higher learning.

- Involving higher degree research students in all areas of expertise in projects aiming to regain universities' control over their technological solutions. Protecting institutional and individual agency represents a major project for universities of the 21st century.

5. Conclusions

The increasing control of the edtech corporate sector over various key areas of education, including education policies, learning and teaching solutions and others, represents a rising concern for many academics, the general public and students. Proven lobbying powers and corruption disguised as academic research often turned higher education into a playground of corporate exploitation and commercialisation of students' lives and education. The unbalanced arrangement of powers in edtech is leaving universities, students, and staff, vulnerable to a set of serious risks that are only succinctly presented in this study. Higher education lost a significant amount of intellectual and moral power to corporate entities and cultures in exchange for some distant gains and market dominance. Research proves a declining trend in the quality of learning (Arun &

Roksa, 2011; 2014), high levels of stress for students and academics (Gewin, 2012; Levecque et al., 2017; Grove, 2018) a general decline in the ethos of academic life proves that the current managerial and ideological model is unsuitable for solutions and for current challenges.

Educational agenda is vastly controlled by masters-of-technology (corporations) uninterested in any educational ideal, but marketability, increasing power and control through data and monopoly structures. A partnership like this cannot be based only on the naive belief that collaboration with the industry is simply a regular game of gains; much more is at stake. What universities' corporate partners in edtech control go beyond even the most complex technical aspects: it is the power to capture and manipulate imaginations and limit possibilities. The Google Academics Inc. report is just an example that reveals the unprecedented extent of power used by a techno-monopoly group that is highly motivated to control academic research across the world. This is where the higher education industry is fuelling a potentially fatal risk for universities.

Universities had and still have intellectual and institutional resources to rebuild an independent identity and an agenda organised by ethical standards in the pursuit of higher learning, civil society and democratic values. The development of AI presents the opportunity to re-emphasize that a university can serve the common good and shift towards a better future. Genuine respect for students and academics, and the effort to rebuild trust as an integral part of the campus ethos can educate responsible and wiser citizens of tomorrow.

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References

Abbas, N., Whitfield, J., Atwell, E., Bowman, H., Pickard, T. & Walker, A. (2022). Online chat and chatbots to enhance mature student engagement in higher education, *International Journal of Lifelong Education, 41*:3, 308-326. [CrossRef]

Aliff, J.V. (1998). *Are students 'customers' of collegiate education?* In Proceedings of the Annual General Meeting of the Georgia Academy of Science, 17 Savannah, GA, 25 April 1998 (1-10). [Google Scholar]

Altheide, D. L., & Schneider, C. J. (2013). *Qualitative media analysis*. Thousand Oaks, CA: Sage, p. 5. [CrossRef]

Arum, R., & Roksa, J. (2011). *Academically adrift: Limited learning on college campuses*. Chicago: University of Chicago Press. [CrossRef]

Arum, R., & Roksa, J. (2014). *Aspiring adults adrift: Tentative transitions of college graduates*. Chicago: University of Chicago Press.

Baleis, J., Keller, B., Starke, C., & Marcinkowski, F. (2019). Cognitive and Emotional Response to Fairness in *AI–A Systematic Review*. [Google Scholar]

Becker, H. S. (1963). *Outsiders: Studies in the sociology of deviance*. New York: The Free Press https://monoskop.org/images/2/2b/Becker_Howard_Outsiders_Studies_In_The_Sociogy_Of_Deviance_1963.pdf

Bohm, A. S., George, A. J., Cyphers, B. & Lu, S. (2017). Privacy and Liberty in an Always-On, Always-Listening World. *The Columbia Science & Technology Law Review*, Vol. XIX, 1-45. https://heinonline.org/HOL/LandingPage?handle=hein.journals/cstlr19&div=3&id=&page=

Bunce, L., Baird, A., & Jones, S. E. (2016). The student-as-consumer approach in higher education and its effects on academic performance. *Studies in Higher Education, 507*, 1–21. [CrossRef]

Cacioppo, J. T., & Patrick, W. (2008). *Loneliness: Human Nature and the Need for Social Connection*. NY: W. W. Norton & Company.

Cameron, R. N., Reidenberg, Joel R. and Martin, Elizabeth and Norton, Thomas, Transparency and the Marketplace for Student Data (June 6, 2018). *Virginia Journal of Law and Technology, Forthcoming*, p. ii. Available at SSRN: https://ssrn.com/abstract=3191436

Channa, F. R., Sarhandi, P. S. A., Bugti, F., & Pathan, H. (2021). Harnessing Artificial Intelligence in Education fr

Preparing Learners for the 21st Century. *Elementary Education Online, 20*(5), 3186-3186 .

Cox, A. (2022). The Ethics of AI for Information Professionals: Eight Scenarios. *Journal of the Australian Library and Information Association, 71*(3), 201-21. [CrossRef]

Daniel, B. (2015). Big Data and analytics in higher education: Opportunities and challenges. *British Journal of Educational Technology, 46*(5), 904-920. [CrossRef]

Day, M., Turner, G., & Drozdiak, N. (2019, April 11). *Thousands of Amazon Workers Listen to Alexa Users' Conversations*. Time. Retrieved from https://time.com/5568815/amazon-workers-listen-to-alexa/

Deakin University. (2014). *IBM Watson now powering Deakin. A new partnership that aims to exceed students' needs*. Retrieved from http://archive.li/kEnXm

Deakin University. (2015). *IBM Watson helps Deakin drive the digital frontier*. Media Release, November 25. Retrieved from https://www.deakin.edu.au/about-deakin/news-and-media-releases/articles/ibm-watson-helps-deakin-drive-the-digital-frontier

Denzin, N. (2009). *The research act (2nd ed.)*. New York: McGraw-Hill https://books.google.pt/books?id=UjcpxFE0T4cC&lpg=PP1&hl=pt-PT&pg=PP1#v=onepage&q&f=false

Diamond, L. (2019, May 17). The Global Crisis of Democracy. *The Wall Street Journal*. Retrieved from https://www.wsj.com/articles/the-global-crisis-of-democracy-11558105463

Draper, N. A. & Turow, J. (2019). The corporate cultivation of digital resignation. *New Media & Society*, 1–16. [CrossRef]

FBI (2018). *Education technologies: data collection and unsecured systems could pose risks to students*. Alert Number I-091318-PSA. Retrieved from: https://www.ic3.gov/media/2018/180913.aspx

Gewin, V. (2012). Mental health: Under a cloud. *Nature, 490*, 299–301. [CrossRef]

Gitelman, L. (Ed.) (2013). *"Raw Data" Is an Oxymoron*. Cambridge, MA: The MIT Press.

Google Transparency Project (2017). *'Google Academics Inc.' Campaign for Accountability*. Retrieved from: https://www.googletransparencyproject.org/sites/default/files/Google-Academics-Inc.pdf

Gordo, B. (2017). "Big Data" in the Information Age. *City & Community, 16*(1), 16-19. [CrossRef]

Grove, J. (2018, July 6). Half of UK academics 'suffer stress-linked mental health problems'. *Times Higher Education*. Retrieved from www.timeshighereducation.com/news/half-uk-academics-suffer-stress-linked-mental-health-problems

Holloway, D. (2019). Surveillance capitalism and children's data: the Internet of toys and things for children. *Media International Australia, 170*(1), 27. [CrossRef]

Hutson, M. (2018). AI researchers allege that machine learning is alchemy. Study cites ways to bolster scientific

foundations of artificial intelligence. *Science, 3* May. [CrossRef]

Jiang, R., Chiappa, S., Lattimore, T., Agyorgy, A., & Kohli, P. (2019). *Degenerate Feedback Loops in Recommender Systems*. In Proceedings of AAAI/ACM Conference on AI, Ethics, and Society, Honolulu, HI, USA, January 27-28, 2019 (AIES '19). Retrieved from https://arxiv.org/abs/1902.10730v3

Kaufman, K. J. (2013). 21 ways to 21st century skills: why students need them and ideas for practical implementation. *Kappa Delta Pi Record, 49*(2), 78–83. [CrossRef]

Knapton, S. (2018). *Artificial Intelligence is greater concern than climate change or terrorism, says new head of British Science Association*. The Telegraph. Retrieved from https://www.telegraph.co.uk/science/2018/09/05/artificial-intelligence-greater-concern-climate-change-terrorism/

Korn, M. (2019). Advance Publications to Buy Plagiarism-Scanning Company Turnitin for Nearly $1.75 Billion. *The Wall Street Journal*. Retrieved from https://www.wsj.com/articles/advance-publications-nearing-deal-to-buy-plagiarism-scanning-company-turnitin-for-1-75-billion-11551887268

Kraemer, F., van Overveld, K., & Peterson, M. (2011). Is there an ethics of algorithms? *Ethics and Information Technology, 13*(3), 251–260. [CrossRef]

Lambrecht, A., & Tucker, C. E. (2018). Algorithmic Bias? An Empirical Study into Apparent Gender-Based Discrimination in the Display of STEM Career Ads Retrieved from https://ssrn.com/abstract=2852260

Levecque, K., Anseel, F., Beuckelaer, A. D., Heyden, J. V., & Gisle, L. (2017). Work organization and mental health problems in PhD students. *Research Policy, 46*(4), 868-879. [CrossRef]

Liu, D.Y-T., Rogers, T., & Pardo, A. (2015). Learning analytics - are we at risk of missing the point? In T. Reiners, B.R. von Konsky, D. Gibson, V. Chang, L. Irving, & K. Clarke (Eds.), *Globally connected, digitally enabled*. Proceedings ascilite 2015 in Perth (pp. DP:33-DP:36)

Lust, P. (1998), "Students as customers: would you like fries with your Shakespeare?", in Osborn, R.E.E. (Ed.), *Scholarship, Service, and Integrity: Benchmarks in a Changing Landscape*, ACHE Proceedings (60th, Ft. Worth, TX, 31 October-3 November, 1998), Pennsylvania, p. 54.

Marík, V., Stepánková, O., & Zdráhal, Z. (1990). *Artificial intelligence in higher education*. CEPES-UNESCO International Symposium, Prague, CSFR, Proceedings 1989, October 23–25.

Matthias, A. (2004). The responsibility gap: Ascribing responsibility for the actions of learning automata. *Ethics and Information Technology, 6*(3), 175-183, p. 175. [CrossRef]

McEvily, B., Perrone, V., & Zaheer, A. (2003). Trust as an Organizing Principle. *Organization Science, 14*(1), 91–103, p. 99. [CrossRef]

Mittelstadt, B.D., Allo, P., Taddeo, M., Wachter, S., & Floridi, L. (2016). The ethics of algorithms: mapping the debate. *Big Data & Society*, 1–21. [CrossRef]

Nguyen, A. & Rosetti, J. (2013). Overcoming potential negative consequences of customer orientation in higher education: closing the ideological gap. *Journal of Marketing for Higher Education, 23*(2), 155-174. [CrossRef]

Nguyen, T. T., Hui, P. M., Harper, F. M., Terveen, L., & Konstan, J. A. (2014). Exploring the filter bubble: the effect of using recommender systems on content diversity. In Proceedings of the 23rd international conference on World wide web (WWW '14). *ACM*, New York, NY, USA. (677-686). [CrossRef]

Nixon, E., et al. (2018). Her majesty the student: marketised higher education and the narcissistic (dis)satisfactions of the student-consumer. *Studies in Higher Education, 43*(6), 927-943. [CrossRef]

Norris, P. (2001). *Digital Divide: Civic Engagement, Information Poverty, and the Internet Worldwide*. Cambridge: Cambridge University Press. [CrossRef]

Ocaña-Fernandez, Y., Valenzuela-Fernandez, L., & Garro-Aburto, L. (2019). Artificial Intelligence and its Implications in Higher Education. *Propósitos y Representaciones, 7*(2), 536-568. [CrossRef]

Pasquale, F. (2015). *The Black Box Society: The Secret Algorithms That Control Money and Information*. Cambridge, MA: Harvard University Press.

Pasquale, F. A., & Citron, D. K. (2014). The Scored Society: Due Process for Automated Predictions. *Washington Law Review* No. 2014 – 8, 89, 1 - 33 https://core.ac.uk/download/pdf/327104566.pdf

Perrigo, B. (2023). *Exclusive: OpenAI Used Kenyan Workers on Less Than $2 Per Hour to Make ChatGPT Less Toxic*. Time, January 18. Retrieved from https://time.com/6247678/openai-chatgpt-kenya-workers/

Pickering, C., and Byrne, J. (2014). The Benefits of Publishing Systematic Quantitative Literature Reviews for PhD Candidates and Other Early-CareerResearchers. *Higher Education Res. Development, 33*, 534–548. [CrossRef]

Pitman, T. (2000). Perceptions of academics and students as customers: a survey of administrative staff in higher education. *Journal of Higher Education Policy and Management*, Vol. 22 No. 2, 165-175.

Popenici, S. (2022). *Artificial Intelligence and Learning Futures: Critical Narratives of Technology and Imagination in Higher Education (1st ed.)*. Routledge, p.25. [CrossRef]

Putnam, R. (1995). Bowling Alone: America's Declining Social Capital. *Journal of Democracy, 6*(1), 65–78. [CrossRef]

Putnam, R. (2000). *Bowling Alone: The Collapse and Revival of American Community*. New York: Simon and Schuster.

Robinson, W. S. (1951). The logical structure of analytic induction. *American Sociological Review, 16*(1), 812–818. https://www.jstor.org/stable/2087508

Rudolph, J., Tan, S., & Tan, S. (2023). ChatGPT: Bullshit spewer or the end of traditional assessments in higher education? *Journal of Applied Learning and Teaching, 6*(1), 1-22. [CrossRef]

Schorn, S. (2007). *Parallel Plagiarism Detection Test of TurnItIn, SafeAssign, and Google*. Retrieved from https://www.insidehighered.com/sites/default/server_files/files/2007PlagTest.pdf

Schorn, S. (2015). *Replicated Text Detection: Test of TurnItIn*. Retrieved from https://www.insidehighered.com/sites/default/server_files/files/2015plagtest.pdf

Selwyn, N. (2019). What's the Problem with Learning Analytics?. *Journal of Learning Analytics, 6*(3), 11–19. [CrossRef]

Sen, A. D., & Bennett, D. (2022). *Tracked: How Colleges Use AI To Monitor Student Protests*. Pulitzer Center. Retrieved September 26, 2022, from https://pulitzercenter.org/stories/tracked-how-colleges-use-ai-monitor-student-protests

Shead, S. (2018). *Top British Scientist Urges Government To Regulate AI*. Forbes. Retrieved from: https://www.forbes.com/sites/samshead/2018/09/06/top-british-scientist-urges-government-to-regulate-ai

Shusterman, R. (1991). Beneath interpretation. In Hiley, D. R., Bohman, J. F. and Shusterman, R. (Eds.). *The interpretive turn: Philosophy, science, culture* (102–128). Ithaca, NY: Cornell University Press, p. 103. https://www.jstor.org/stable/1448863

Siemens, G., & Long, P. (2011). Penetrating the fog: Analytics in learning and education. *EDUCAUSE review, 46*(5), 31-40, p. 32.

Sprenger, P. (1999). *Sun On Privacy: 'Get Over It'. Wired*. Retrieved from https://www.wired.com/1999/01/sun-on-privacy-get-over-it/

Stolzoff, S. (2018). *Schools are using AI to track what students write on their computers*. Quartz. Retrieved from https://qz.com/1318758/schools-are-using-ai-to-track-what-students-write-on-their-computers

Straumsheim, C. (2015) *What Is Detected? Tests conducted by a writing coordinator at the U of Texas at Austin suggest that many student plagiarists could avoid being caught by Turnitin*. https://www.insidehighered.com/news/2015/07/14/turnitin-faces-new-questions-about-efficacy-plagiarism-detection-software

Talbot, D. (2013). The Era of Ubiquitous Listening Dawns. *MIT Technology Review*. Retrieved from http://www.technologyreview.com/news/517801/the-era-of-ubiquitous-listening-dawns

Taylor, C., Fox, S., Evans, C. & Rees, G. (2019). The "civic premium" of university graduates: the impact of

massification on associational membership. *Studies in Higher Education*. [CrossRef]

Tucker, E. (2022). Artifice and Intelligence. *Center on Privacy & Technology*. Retrieved from https://techpolicy.press/artifice-and-intelligence/

TurnitIn (2019). *Turnitin for Higher Education. Create a culture of academic integrity*. Retrieved from: https://www.turnitin.com/divisions/higher-education

White House (2014). *Big Data: Seizing Opportunities, Preserving Values*. Washington DC: Executive Office of the US President. Retrieved from: https://obamawhitehouse.archives.gov/sites/default/files/docs/big_data_privacy_report_may_1_2014.pdf

Woodcock, C. (2022). *Students Are Using AI to Write Their Papers, Because Of Course They Are*. VICE. Retrieved November 1, 2022, from https://www.vice.com/en/article/m7g5yq/students-are-using-ai-to-write-their-papers-because-of-course-they-are

Zuboff, S. (2019). *The age of surveillance capitalism. The fight for the future at the new frontier of power*. London: Profile Books. https://profilebooks.com/work/the-age-of-surveillance-capitalism/

Using the Sonic Pi Application for Educational Purposes – A Literature Review

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Using the Sonic Pi Application for Educational Purposes – A Literature Review

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Abstract	
Keywords: Sonic Pi; literature review; digital technologies; digital music; first programming language.	The Sonic Pi app has been available since 2013, the main purpose for which it was developed being to make teaching programming accessible to students as young as 10 years old. The present study traces the impact of the academic literature on the educational use of Sonic Pi during the first 10 years its availability, conducting a literature review based on the querying of 3 databases. During the search, there were identified 18 relevant, 4 theoretical and 14 research articles. It was found that the theoretical articles put forward a series of assumptions that come with the premise of improving the teaching-learning process, through an interdisciplinary openness of the didactic act, making contents accessible, offering a positive experience with a first programming language, as well as achieving funny activities and products. These aspects were correlated with the results of the research articles selected for analysis. The amount of work published on this topic, even if it is not large, remains unchanged in relation to the time variable and recommends the use of Sonic Pi in education as a suitable tool for working on creativity through a programming language, including young ages, because playing with codes and sounds respects a child's right: the right to play.

Zusammenfasung	
Schlüsselworte: Sonic Pi; Literatische Rezension; digitale Technologien; digitale Musik; erste Programmiersprache.	Die Sonic Pi-App gibt es seit 2013. Der Hauptzweck, zu dem sie entwickelt wurde, bestand darin, Schülern bis 10 Jahren das Unterrichten von Programmieren zugänglich zu machen. Die vorliegende Studie untersucht die Auswirkungen der wissenschaftlichen Literatur auf den pädagogischen Einsatz von Sonic Pi während der ersten 10 Jahre der Anwendung und führt eine Literaturrecherche auf der Grundlage der Konsultation von drei Datenbanken durch. Im Anschluss an die Suche wurden 18 relevante, 4 theoretische und 14 Forschungsartikel identifiziert. Es wurde festgestellt, dass in den theoretischen Artikeln eine Reihe von Annahmen aufgestellt wurden, die mit der Prämisse einhergehen, den Lehr-Lern-Prozess durch eine interdisziplinäre Offenheit des didaktischen Akts zu verbessern, Inhalte zugänglich zu machen und eine positive Erfahrung mit einer ersten Programmiersprache zu bieten sowie das Erreichen unterhaltsamer Aktivitäten und Produkte, Aspekte, die mit den Ergebnissen der für die Analyse ausgewählten Forschungsartikel korrelieren. Die Menge der veröffentlichten Arbeiten zu diesem Thema, auch wenn es sich nicht um eine große handelt, bleibt im Verhältnis zur Zeitvariablen unverändert und empfiehlt den Einsatz von Sonic Pi im Bildungsbereich als geeignetes Werkzeug, um mithilfe einer Programmiersprache an Kreativität zu arbeiten, auch bei jungen Menschen Alter, denn das Spielen mit Codes und Geräuschen respektiert das Recht eines Kindes: das Recht zu spielen.

1. Introduction

The use of digital technologies has made the teaching-learning process able to approach the contents in more depth. If, in the past, students were told in school about the highest mountain peaks in the world, now digital technologies through virtual reality can lead the student from the base to the top of the mountain. The student can also visit, virtually, famous buildings, historical monuments or museums, and these are just a few examples of the fact that digital technologies have made knowledge more accessible. This means not only an easier assimilation of information, but also a better one, such as Wong et al. (2007) have shown through a study that, in general, the presentations of educational materials using modern media possibilities are superior to traditional presentations.

About the use of digital technologies in education, two aspects are recognized. The first one refers to socio-emotional skills, students' motivation being positively influenced using digital technologies (Ruiz-Banuls et al., 2021), as they like to learn through interaction with appropriate technologies (Webster, 2002). The second aspect concerns cognitive and practical skills, as it is recognized that as digital technologies are integrated into the education process, new opportunities are being offered for innovative teaching, creative learning, which should lead to improved student outcomes (Albulescu, 2021).

A proposal for increasing students' motivation and achieving learning in a creative way is the integrated approach of music with computer programming. An example of the development of such practices, involving music and programming in a formal learning framework, comes from the reforms brought to the Italian education system. With these reforms there are proposals put into practice, which combine "pedagogical advantages of coding and music education in primary school thanks to *music coding*, a new discipline that couples algorithmic thinking, technological tools, and computer interaction with musical experience, creativity, and social processes" (Ludovico & Mangione, 2015, p. 454). This is not only an example of creative activity, but also of creative pedagogy, which can allow students to switch their inspiration base from one of the fields of study in which music or programming is found, to the study of the other. Writing computer software to enable learning in various fields, including that of music, resonates with any projection of didactic act in which the processing of educational content through Computer Assisted Instruction (CAI) is considered. Such an approach transforms the concepts of the discipline into a concrete activity that can be applied and tested (Brown, 2007).

Nowadays, children can learn programming in various ways, which also allow them to value their creativity, and this can be triggered and supported with the help of music. Perhaps the most successful tool, designed as a teaching tool that allows simultaneous exploration of music and programming, is the Sonic Pi app, a project started in November 2013 (Aaron, 2016a). The purpose of this study is to review articles written on the Sonic Pi application to analyze its operationalization in an educational context, during the first 10 years of the software's existence. Before getting to the details of the literature review, a brief presentation of the application will be made.

2. Soni Pi overview – background for literature review

Created in 2013 (Aaron et al., 2016), Sonic Pi was designed for educational purposes, to run on the Raspberry Pi computers which were released in 2012 (Aaron, 2016a) and also aimed for the education sector, small computers the size of a deck of playing cards that students could purchase at a low cost. The app is also available for Windows and macOS users and they can get it for free (Cass, 2019). The educational purpose is disclosed by the author of the application itself, who states that "the remit was to

explore a new software system that might have the potential to engage schoolchildren in the UK's newly drafted Computing curriculum" (Aaron, 2016b, p. 172). The application comes from the academic environment, given the fact that "Samuel works as a Research Associate at University of Cambridge Computer Laboratory, where he has created Sonic Pi, a powerful live coding environment for real-time sound synthesis targeted for education" (Aaron et al., 2016, p. 93). In addition to teaching programming and music in school, Sonic Pi is also used to create live coding music for people to enjoy and dance in clubs. From an educational point of view, the apps used in education are relevant and valuable when they provide opportunities to create music which were previously unavailable to students (Brown, 2007), and Sonic Pi fits this belief very well as it makes music creation accessible through hands-on programming for kids. Since it can also be used in social contexts, the application has multiple uses, it is not limited to satisfying a single need, having the ability to offer, computationally thinking, creative experiences regarding the generation of digital music, both for children and adults (Aaron & Blackwell, 2013).

In detail, the Sonic Pi app's interface, shown in Figure 1, is extremely simple and easy to use, allowing simple text commands to be matched with immediate feedback that brings concrete sonic appearance (Traversaro et al., 2020).

For a brief but to-the-point description, the application interface has been divided into 4 work areas. The most used is zone 2 (text code editor), the zone where text instructions are written from the keyboard and which represents the input data in the music program that will be created. The completed program, which will generate a melodic fragment (output data), will reveal a cause-effect relationship, between input and output data, that can be tested immediately, by pressing the Run button in zone 1 (Control buttons). As the program can be tested immediately, the application providing immediate feedback through the sound effect determined by the written commands, Traversaro et al. (2020) have mentioned the direct connection between the written commands and the tangible, concrete, prompt response. The control buttons in zone 1 also offer other possibilities, to record or save the melodic fragment made or to open/ hide other windows intended for various configurations within the program. Such windows are located in zone 3 (settings and reports), but also in zone 4 (area with help elements), where the user can find a tutorial of the application, examples of

functional codes of some songs, as well as other useful information.

Figure 1. Sonic Pi app user interface (version 3.3.1)
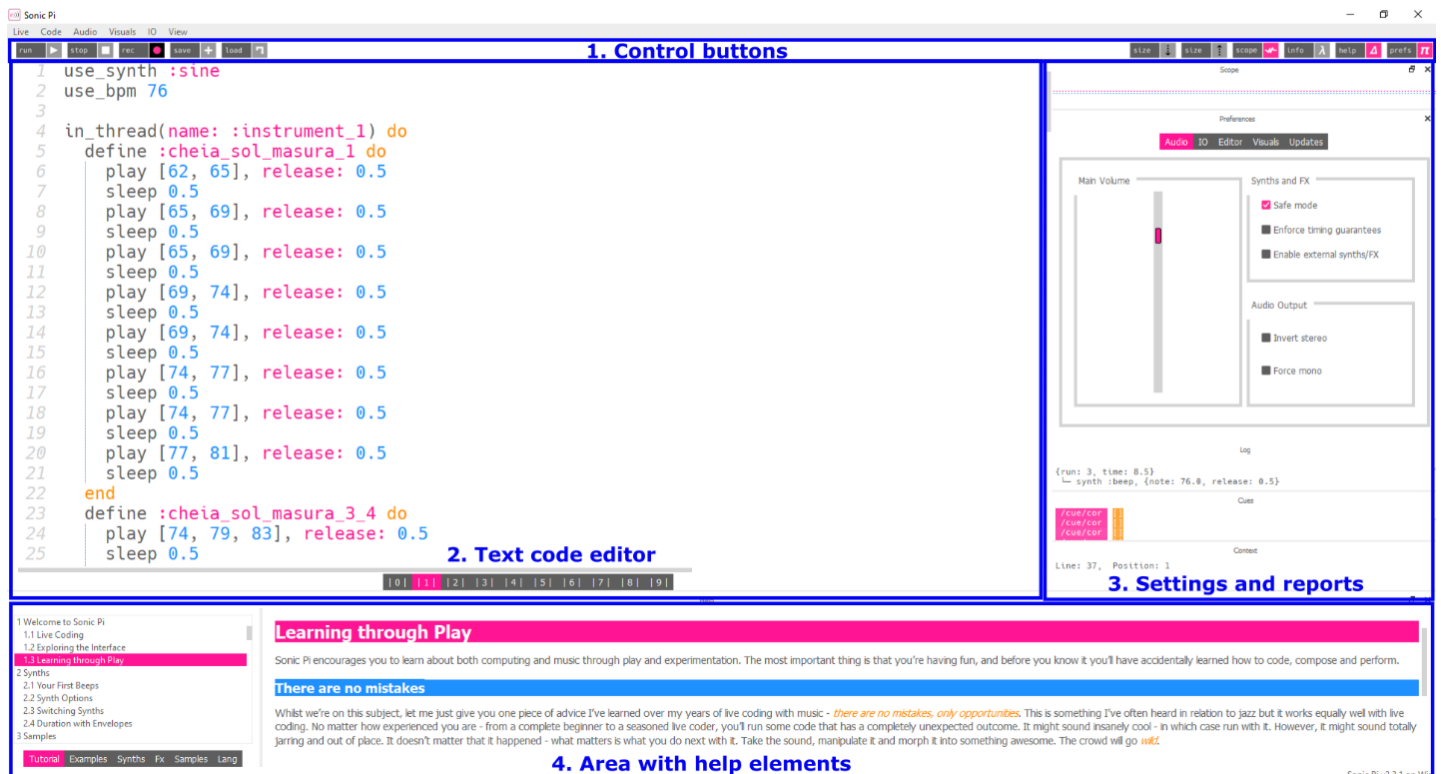
Sonic Pi is a teaching tool that emphasizes the role of creativity in learning because the application is a gateway to the heart of the principles of electronic music and also a great way to work on creativity, giving students the opportunity to think and translate instantly personal musicals ideas into finished products, the process being realized through play. This aspect is particularly important for the teaching-learning process, bearing in mind that performing music live, compared to recordings or listening to music, provides an enhanced experience with a better effect on learning (Váradi, 2018), because "creation processes involve cognitive change" (Koper, 2014, p. 13). At the same time, the benefits or utility of the application can be extended from the individual level to the institutional level, as "the Sonic Pi project addresses ways in which schools can be innovative spaces for nurturing new collaborative learning digital communities through digital making" (Burnard et al., 2016, p. 346). Sonic Pi, providing the possibility of digital music creation, responds to Webster's model of creative thinking in music (Hickey & Webster, 2001), in the sense that it covers this whole complex process, from the beginning of an idea to the formulation of a solution and the realization of the creative product. Thus, a complex process is developed that does not exclude any of the dimensions: conceptual (computational thinking), procedural (programming language) and applicative (the application and the performer, the computer, the musical field).

3. Research methodology

This paper falls under the category of literature reviews. In general, literature reviews deal with the breakdown of literature written in a certain field, with the aim of summarizing the state of knowledge in that field (Rowley & Slack, 2004). In particular style, the paper is a literature review made around the Sonic Pi application. The literature review was carried out in stages, which will be described in the following.

3.1. Research questions

The research questions, to which the genesis of this study is related to, are:

Q1. How much research has been done, on the use of Sonic Pi in education, during the first 10 years of the app's existence?

Q2. Which are the forms of education in which the Sonic Pi application has been mainly tested?

Q3. Are the results of the research articles in which the Sonic Pi application was used, correlated with the educational assumptions made by the theoretical articles?

Regarding the first research question (Q1) it was mentioned that the Sonic Pi application was developed in 2013 (Aaron et al., 2016), aimed for education and for conducting lessons in school (Aaron, 2016b). The application being made with such a purpose, in the first instance, of interest was the extent to which the application was tested in an educational context.

Regarding the second research question (Q2), it was emphasized that Sonic Pi could play an important role in developing new pedagogical practices and improving learning in various educational contexts (Burnard et al., 2017). For this reason, the next aspect of interest was the accounting of the forms of education for which these assumptions were verified.

Regarding the last research question (Q3), in contrast to question Q1 where a quantitative evaluation of the testing of the Sonic Pi application in an educational context was pursued, now qualitative aspects were pursued, the interest being focused on the results of the testing in terms of knowledge, skills or attitudes formed in the research subjects.

3.2. Data collection

The search and data collection process was manual, checking three databases. As we aimed to conduct a review that considered important academic literature, articles were screened in the Web of Science databases (Clarivate, n.d.) and Mendeley which provide high-quality literature and data indexed in Scopus (Elsevier, n.d.). In order to expand the search spectrum, articles were also searched in Google Scholar, which, even though it does not offer full peer-reviewed articles, has become an extremely useful source of documentation, allowing access to a range of journals that would otherwise not be possible to consult even through institutional libraries and databases (Denney & Tewksbury, 2013).

Therefore, multiple databases were consulted, and the data extracted from the analyzed papers included a series of information, among which we mention: the authors of the papers, the year of publication, the title of the paper, the type of the paper (if it is a research article or a theoretical one), the number of research subjects, their age, the framework of the research as well as the results obtained.

3.3. Article filtering criteria

Certain criteria were applied to include relevant articles and exclude those that do not fit the scope of the paper, which will be listed below.

In terms of article inclusion, even theoretical articles were counted as they generally advance a number of premises and looked for a relationship between what is assumed by using the Sonic Pi application (theoretical articles) and the results of its use (research articles). In identifying relevant articles from journals or conference proceedings, a search criterium was that the terms Sonic and Pi were joined in the title, abstract or keywords.

Regarding the exclusion of articles, papers in other fields than Educational Sciences will not be considered, papers other than those written in English will not be considered, and also papers in which the Sonic Pi application is provided as an example being only mentioned tangentially in papers in computer education, music education, or educational sciences.

3.4. Data analysis

The data collected and mentioned above were arranged in tabular form to highlight, in the first stage, that the articles selected for the review correspond to the inclusion and exclusion criteria described above and that they represent relevant studies for the purpose of the present study. Later, the data centralized in the tables will be reflected in a section dedicated to a more thorough discussion of the issue of interest in this case.

4. Results

As a result of searching on the topic "Sonic Pi", Web of Science returned 7 results, Mendeley 32 results, and Google Scholar 930. After a first filter in which articles written in other fields, such as environmental science and engineering were removed, noting the use of the term Sonic Pi in the respective field. Also, were removed articles dedicated to the software application but written in various languages (German, Spanish, Korean, Russian) or articles dealing with related digital technologies such as Raspberry Pi or TunePad and tangentially mentioning the Sonic Pi application. This filtering resulted in 26 viable articles.

After reading all the 26 articles in full, another 8 articles were eliminated because they did not correspond to the purpose of the paper in that they were articles aimed for a professional context of using the application, given the fact that a second objective stated in the design of the application was to support artists in the actions of offering moments of live musical performance (Aaron, 2016b). This was the case for the articles that have dealt with topics related to live coding (Blackwell & Aaron, 2019; Blackwell et al., 2014; Brown, 2016; Heyen et al., 2022) or

software development (Blackwell & Aaron, 2015; Du Bois & Ribeiro, 2019). The use of the Sonic Pi application in bioinformatics was also identified, by representing information in another format and transposing it from visual language to auditory language, in cases such as protein sequence (Martin et al., 2021) or DNA sequence (Plaisier et al., 2021). These papers were not included in the final analysis, as they did not correspond to the purpose of the literature review. After the second stage of article filtering, 18 papers remained, which are presented in Table 1:

Table 1. Literature review articles over the use of the Sonic Pi application for educational purposes

No.	Batabase	Author	Date	Article type
1	WoS, Mendeley, GS	Aaron	2016a	Theoretical article
2	Mendeley, GS	Aaron	2016b	Theoretical article
3	Mendeley, GS	Aaron and Blackwell	2013	Research article
4	Mendeley, GS	Aaron et al.	2014	Theoretical article
5	Mendeley, GS	Aaron et al.	2016	Research article
6	GS	Bănuț et al.	2023	Research article
7	GS	Burnard et al.	2016	Research article
8	GS	Burnard et al.	2017	Research article
9	GS	Cass	2019	Theoretical article
10	GS	Cheng	2018	Research article
11	Mendeley, GS	Dimitri	2015	Research article
12	GS	Köppe	2020	Research article
13	Mendeley, GS	Lusa Krug et al.	2021	Research article
14	WoS, Mendeley, GS	Petrie	2022a	Research article
15	WoS, Mendeley, GS	Petrie	2022b	Research article
16	Mendeley, GS	Sinclair	2014	Research article
17	GS	Thieme et al.	2017	Research article
18	Mendeley, GS	Traversaro et al.	2020	Research article

Note. WoS – Web of Science; GS – Google Scholar

Therefore, following the search process and the analysis of the search results, 18 unique results were identified, 4 being theoretical articles and 14 research articles, the frequency of publication by year being presented in Table 2, for a subsequent correlation of these data with the question of research Q1.

Table 2. Articles included in the literature review by publication date

Type	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Total
TA	-	1	-	2	-	-	1	-	-	-	-	4
RA	1	1	1	2	2	1	-	2	1	2	1	14

Note. TA – Number of Theoretical Articles; RA – Number of Research Articles

In order to be able to answer the other two questions formulated (Q2 & Q3), the data of the research articles were split in Table 3, going into the details of the research design, with their objectives and results.

Table 3. Data from articles research design included in the literature review

No.	Author	Date	Number of participants	Age of participants	Forms of education	Tracked aspects
1	Aaron and Blackwell	2013	2 classes	11-12	formal	programming competence
2	Aaron et al.	2016	1 teacher	-	formal	teaching-learning process
3	Bănuț et al.	2023	25	10-11	formal	creative expression skills
4	Burnard et al.	2016	6 teachers 44 students	13-14	formal &	interdisciplinary activities & attitudes that express enjoyment
			60 children		informal	
5	Burnard et al.	2017	54 students	12-14	formal &	teaching-learning process
			60 children	10-16	informal	
6	Cheng	2018	39	+19	formal	pedagogical context, motivational effect & effective learning
7	Dimitri	2015	10	+18	formal	problem solving: debugging
			1	13		
8	Köppe	2020	85	12-15	informal	experiences & motivating context
			90	15-17		
9	Lusa Krug et al.	2021	45	10-12	informal	engagement and attitude towards informatics
10	Petrie	2022a	22	11-12	formal	knowledge in programming
11	Petrie	2022b	22	11-12	formal	attitude towards programming
12	Sinclair	2014	12	+18	formal	programming concepts retention
13	Thieme et al.	2017	10	8-12	informal	programming skills at visual impairment children
14	Traversaro et al.	2020	131	+18	formal	engagement and competences in programming

Therefore, through the articles resulting from some research in which the Sonic Pi application was used, a series of essential aspects in the teaching-learning process were targeted, which will be reflected in the following discussions.

5. Discussions

The present section is addressed to some preliminary findings made after the data collection process, along with the inventory of some assumptions brought by the few theoretical articles included in the study, as well as the discussion of the answers to each of the research questions.

First, starting from the statement about the way the Sonic Pi application was designed, which had in mind the expansion of the possibilities of teaching computer science in schools, but also the opening of new possibilities of making live musical performances (Aaron, 2016b), has been found that the application was used for the purposes for which it was developed (Du Bois & Ribeiro, 2020), but also for purposes that exceed the imagination of the design and that were not foreseen or taken into account. This category includes the use of Sonic Pi in the field of bioinformatics sonification (Martin et al., 2021; Plaisier et al., 2021), but also in making the teaching of programming accessible to visually impaired students (Thieme et al., 2017), and these aspects confirm the fact that the product is an important and versatile one, with utility in several fields.

While articles dealing with the use of Sonic Pi in bioinformatics were not included in this literature review because the application was not used in an educational context and this is not consistent with the purpose of the paper, the use of the application to introduce visually impaired students to programming is of interest for the desired analysis. Even though the app was only a connected tool with which the students did not interact physically, but only auditory, as it was used in learning contexts where working with visually impaired students, this audio component of the Sonic Pi app proved to be a useful one in inclusive programming learning contexts for visually impaired students. To create musical programs, they connected physical elements of various sizes, called "instruction beads", and the way these elements are interconnected generates sounds digitally (sound timbre, pitch) in the Sonic Pi language (Thieme et al., 2017).

5.1. Assumptions of theoretical articles

The theoretical articles highlight the fact that the Sonic Pi application was designed for educational purposes to give students a positive experience with a first programming language (Aaron et al., 2014), being a simple enough tool for teachers who teach programming in schools and which, by integrating audio feedback, manages to facilitate students' learning and understanding of concepts (Aaron, 2016a). Also, the app has a friendly front-end (Cass, 2019), and all these features are essential in the teaching-learning process, because they translate into accessibility, being known that not only many pupils, but also college students fail to learn programming (Bosse & Gerosa, 2017; Piteira & Costa, 2013; Robins, 2015).

In the development of the application, it was started from the premise that its use for educational purposes frames learning with the contemporary daily experience of students, in the digital age, and education could benefit from interdisciplinary learning. Integrating music with programming and being used in the teaching process, Sonic Pi determines learning situations designed to produce performance in everyday life, because Sonic Pi stands for performance in education, technology and art (Aaron, 2016b).

Given the fact that the paper deals with the use of an application for educational purposes, an essential element for capturing attention in the classroom is that the teaching is done in a way that is enjoyable for the students, maybe even funny at times, and the products of the activities in which the Sonic Pi application is used would be fun (Cass, 2019).

5.2. How much research has been done, on the use of Sonic Pi in education, during the first 10 years of the app's existence?

In the search process and in the documentation sources consulted, 18 papers relevant to the purpose of the proposed literature review were identified: 14 of them were research articles and 4 were theoretical articles. This accounting emerges from Table 2, where the distribution of articles by year was also made, the average of publications being a constant one throughout this period. So, the amount of published papers, even if is not a large one, remains unchanged in relation to the time variable. Of the total of 18 works inventoried, 12 have a distinct primary author, which is a good diversity given that only the author of the application, Sam Aaron (Cass, 2019) has more than two papers selected, according to Table 1. Overall, academic publication on the use of Sonic Pi in education is a constant one, and it seems that publishing and indexing of academic literature with this topic is encouraged.

5.3. Which are the forms of education in which the Sonic Pi application has been mainly tested?

It was stated that Sonic Pi could facilitate modern and forward-looking teaching approaches, new pedagogies, for better learning outcomes in different contexts: formal as well as informal, for example summer camps (Burnard et al., 2017). In this sense, the interest was on which of the forms of education the use of the application was researched for, and only this aspect, the research results being of interest for research question Q3. Table 3 shows that, out of the 14 research articles, 9 had the research action carried

out in formal learning contexts, 3 informal and two monitored the development of skills, intellectual faculties or some socio-emotional aspects in both contexts. This distribution covers sufficiently both forms of education to see, through the next question (Q3), whether the results of the research processes are congruent, regardless of the learning context.

5.4. Are the results of the research articles in which the Sonic Pi application was used, correlated with the educational assumptions made by the theoretical articles?

As regards the objectives pursued by the analyzed researches, Table 3 summarizes and presents the following aspects:

▪ 6 articles focused on programming skills and knowledge developed through the use of the Sonic Pi application;

▪ 4 articles considered the pedagogical contexts of introducing the Sonic Pi application in activities with students;

▪ 4 articles considered socio-emotional aspects of subjects' interaction with the Sonic Pi app.

Regarding the knowledge and skills measured by the 6 studies, they were correlated with the duration of the activities they took part in and the age of the participants. Regarding the duration of the activities, they took place in the form of tutorials or learning modules and did not have similar durations, each researcher having his own program, some shorter, 5 x 1 hour lessons (Aaron & Blackwell, 2013) or others of longer duration, 24 x 1 hour lessons (Bănuț et al., 2023). Being known been that activities must last long enough to actually have an impact over the outcome (Creswell, 2008), remarkably, the acquisition of programming skills has been reported for relatively short courses (Aaron & Blackwell, 2013), as well as in the other cases with different research durations (Petire 2022a; Sinclair, 2014; Traversaro et al., 2020). These findings resonate with the assumption drawn from the theoretical articles, which rely on audio feedback as a facilitator of student understanding of programming concepts (Aaron, 2016a).

Compared to the average age of the participants, in 6 of the 14 studies analyzed (according to Table 3), it has been worked with students with an average age of 10-12 years. In all these cases, there were obvious skills developed following the work sessions with the Sonic Pi application (Aaron & Blackwell, 2013; Bănuț et al., 2013; Petrie, 2022b), even when working with visually impaired students (Thieme et al., 2017),

which confirms the assumption that the Sonic Pi application was designed as a tool for students' successful approach of a first programming language (Aaron et al., 2014). This aspect is reinforced by the interesting case in which the researchers worked with a group of students from the 1st year of college, but also with a 13 years old student, the performances reported at the end of the training period being similar for the two age categories (Dimitri, 2015).

In some of the studies, the research subjects included teachers (Aaron et al., 2016; Burnard et al., 2016), who were surveyed to collect a series of reflections about the teaching-learning process. In these cases, as well as in other cases where pedagogical aspects were pursued (Burnard et al., 2017; Cheng, 2018), the Sonic Pi app was found to offer new learning routes, which resonates with the premise that education could benefit from interdisciplinary learning (Aaron, 2016b), especially since music can be a motivational factor (Blackwell & Aaron, 2015).

The motivational power of music, not just in a general way, is confirmed by the experiences, engagement and attitude towards the programming activities shown by the students who used the Sonic Pi application to produce melodic-rhythmic fragments (Köppe, 2020; Lusa Krug et al., 2021; Petrie, 2022b; Traversaro et al., 2020). They confirm the premise that the products of students' activity using the app would be fun (Cass, 2019), because Sonic Pi, in the hands of students, becomes a musical toy. From the didactic perspective of the music education approach at a young age, the school curriculum of the subject *Music and movement* (MEN, 2014) highlights the use of musical toys in a variety of forms as an essential requirement in the study of music, the studies in this literature review showing that the Sonic Pi can convincingly be a valid tool for use in music classes and beyond.

To answer the research question, yes, the theoretical articles make several assumptions, and these are correlated with the results of the research articles, in all education forms and cases analyzed.

6. Conclusions

The Sonic Pi digital tool was created for the formal educational environment, in the first instance, in the perspective of teaching in schools, the main objective being to obtain an application that simplifies the transmission of programming concepts so much that it can be used by students from the age of 10 years (Aaron, 2016a; Blackwell & Aaron, 2015). The age

barrier falls so much because Sonic Pi ensures a child's right, the right to play, the digital tool being engaging and fun, so that students can play and learn implicitly through this play.

Thus, students can express their creativity both through music and programming, creating a context through which computer science education can make musical education great again for the mainstream educational system. In this context, students are given the opportunity to create interesting artefacts, such as digital audio materials, and this aspect is particularly important because students will not be educated in music without feeling the joy of creating (Váradi, 2018). There is another way of music creation that is relevant to the digital age, and that is digitally obtained music, and the Sonic Pi does a great job of it. This type of creative experience can be an outcome of a formal learning context, as the application can cover a wide range of activities and content. Students can explore various content areas such as: (a) vocal singing, obtaining the sound lines of songs from children's folklore, on which to perform a vocal performance, (b) instrumental singing, the application being able to reproduce a variety of musical timbres, (c) elements of music language, musical notation being able to be translated and written in another symbolistic, that of codes or (d) movement on music, these being able to take place simultaneously, a general idea that reflects the concept of eurythmy.

Creatively using digital technologies, along with computer programming, are distinct skills within digital competence (Vuorikari et al., 2022), and if these capabilities are well formed, they will be the engine of future innovative processes and products. On the other hand, stimulating creativity will lead to opportunities and implications in the development of other key competences, not just digital competence. Knowing the possibilities of creative use of digital technologies increases the possibilities of development, and if students do not know such possibilities, the training of future adults will not have a significant impact on the economy, because digital technologies set the tone for changes in society and, at the same time, require new skills for future generations.

Sonic Pi is an appropriate tool to work on creativity and provide a positive first experience for students with a programming language, and the aspects mentioned in the conclusions emphasize the usefulness of the application, even under the limits of this literature review, to be conducted by a single

author, the data being interpreted and discussed from a single perspective. The results of the studies selected for evaluation are encouraging, and new directions for both research and teaching can be advanced. In terms of teaching, there is an intention to use the app at university level, for the training of future teaching staff, as creativity should be a component of CAI, and Sonic Pi does well in this regard. In terms of research, there is an intention to use the Sonic Pi app for another context which it might be proper for, using it in a gamified setting. It is known that Sonic Pi was designed to be a motivational factor in learning, an effect that gamification also aims at, which is why it is interesting to know if used simultaneously in the act of teaching they can represent a motivational booster, and the framework of teaching would be a song contest, with the stake: "The prize for the most creative student in the school".

Authors note:

Marius Bănuț is an engineer and a PhD. in Educational Sciences with research interest in looking for relationships between the domain-specific knowledge and digital technologies that can be capitalized and correlated with the particularities of the young students, through digital education and interdisciplinary openings. These interests aim for a didactic act capable of producing contextualized learning and the development of digital competence, useful in: current student activity (efficiency and motivation), transition to higher levels of schooling, participation in active citizenship and the economy of the future, and a life-long love for technology and knowledge.

References

Aaron, S. (2016a). Sonic Pi—Reliable randomisation for performances. In *2016 IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC)*, 242-243. IEEE.

Aaron, S. (2016b). Sonic Pi–performance in education, technology and art. *International Journal of Performance Arts and Digital Media*, *12*(2), 171-178.

Aaron, S., & Blackwell, A. F. (2013). From sonic Pi to overtone: creative musical experiences with domain-specific and functional languages. In *Proceedings of the first ACM SIGPLAN workshop on Functional art, music, modeling & design*, 35-46.

Aaron, S., Orchard, D., & Blackwell, A. F. (2014). Temporal semantics for a live coding language. In *Proceedings of the 2nd ACM SIGPLAN international*

workshop on Functional art, music, modeling & design*, 37-47.

Aaron, S., Blackwell, A. F., & Burnard, P. (2016). The development of Sonic Pi and its use in educational partnerships: Co-creating pedagogies for learning computer programming. *Journal of Music, Technology & Education*, *9*(1), 75-94.

Albulescu, I. (2021). Competențele digitale ale profesorilor [The digital competences of teachers]. In Albulescu, I., & Catalano, H., (Eds.), *e-Didactica. Procesul de instruire în mediul online*, (pp. 41-62). Didactica Publishing House, București.

Bănuț, M., Albulescu, I., & Simion, A. (2023). Creativity Pedagogy: Students' Expression Through Music And Programming. *European Proceedings of Educational Sciences, 6*, 306-321. https://doi.org/10.15405/epes.23056.28.

Blackwell, A. F., & Aaron, S. (2015). Craft practices of live coding language design. In *Proc. first international conference on live coding*. Zenodo.

Blackwell, A. F. & Aaron, S. (2019). Live coded mashup with the Humming Wires. In N. Cook, M.M. Ingalls and D. Trippett (Eds.). *The Cambridge Companion to Music in Digital Culture*, (pp. 170-174). Cambridge University Press.

Blackwell, A. F., Aaron, S., & Drury, R. (2014). Exploring Creative Learning for the Internet of Things era. In *PPIG* (p. 12). http://users.sussex.ac.uk/~bend/ppig2014/17ppig2014_submission_3.pdf

Bosse, Y., & Gerosa, M. A. (2017). Why is programming so difficult to learn? Patterns of Difficulties Related to Programming Learning Mid-Stage. *ACM SIGSOFT Software Engineering Notes, 41*(6), 1-6. https://doi.org/10.1145/3011286.3011301

Brown, A. R. (2007). Software development as music education research. *International Journal of Education & the Arts, 8*(6), 1-14. http://www.ijea.org/v8n6/v8n6.pdf

Brown, A. R. (2016). Editorial. *Journal of Music, Technology & Education, 9*(1), 3-4. https://doi.org/10.1386/jmte.9.1.3_2

Burnard, P., Florack, F., Blackwell, A. F., Aaron, S., & Philbin, C. A. (2017). Learning from Live Coding. In *The Routledge Companion to Music, Technology, and Education* (pp. 61-72). Routledge.

Burnard, P., Lavicza, Z., & Philbin, C. A. (2016). Strictly coding: Connecting mathematics and music through digital making. In *Proceedings of Bridges 2016: Mathematics, Music, Art, Architecture, Education, Culture*, 345-350.

Cass, S. (2019). Illuminating musical code: Program an electronic music performance in real time-[Resources_Hands On]. *IEEE Spectrum*, *56*(09), 14-15.

Cheng, L. (2018). Teaching live coding of electronic dance music: A case study. *Dancecult*, *10*(1), (p. 11).

Clarivate. (n.d.). *Clarivate*. https://access.clarivate.com

Creswell, J. W. (2008). *Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research*. Pearson, 3rd edition, United States

Denney, A. S., & Tewksbury, R. (2013). How to write a literature review. *Journal of criminal justice education*, *24*(2), 218-234.

Dimitri, G. M. (2015). The impact of Syntax Highlighting in Sonic Pi. In *PPIG* (p. 12) https://www.ppig.org/files/2015-PPIG-26th-Dimitri.pdf

Du Bois, A., & Ribeiro, R. (2019). Combining Effects in a Music Programming Language based on Patterns. In *Anais do XVII Simpósio Brasileiro de Computação Musical*, 106-113.

Elsevier. (n.d.). *Reference Manager - Mendeley | Elsevier Solutions*. https://www.elsevier.com/solutions/mendeley

Heyen, F., Aygün, D., & Sedlmair, M. (2022). A Web-Based MIDI Controller for Music Live Coding. In *Ismir 2022 Hybrid Conference*.

Hickey, M., & Webster, P. (2001). Creative thinking in music. *Music Educators Journal, 88*(1), 19-23. https://doi.org/10.2307/3399772

Koper, R. (2014). Conditions for effective smart learning environments. *Smart Learning Environments, 1*(1), 1-17. https://doi.org/10.1186/s40561-014-0005-4

Köppe, C. (2020). Program a hit--using music as motivator for introducing programming concepts. In *Proceedings of the 2020 ACM Conference on Innovation and Technology in computer science education*, 266-272.

Ludovico, L. A., & Mangione, G. R. (2015). Music coding in primary school. In *Smart Education and Smart e-Learning*, 449-458. doi: 10.1007/978-3-319-19875-0_40

Lusa Krug, D., Bowman, E., Barnett, T., Pollock, L., & Shepherd, D. (2021). Code Beats: A Virtual Camp for Middle Schoolers Coding Hip Hop. In *Proceedings of the 52nd ACM Technical Symposium on Computer Science Education (SIGCSE '21)*, 397-403. https://doi.org/10.1145/3408877.3432424

Martin, E. J., Meagher, T. R., & Barker, D. (2021). Using sound to understand protein sequence data: new sonification algorithms for protein sequences and multiple sequence alignments. *BMC bioinformatics*, *22*(1), 1-17. https://doi.org/10.1186/s12859-021-04362-7

Ministerul Educației Naționale [MEN] (2014). Programa școlară pentru disciplina *Muzică și mișcare* clasele a III-a - a IV–a și aprobată prin Ordinul MEN nr. 5003/02.12.2014 [The school curriculum for the Object *Music and movement*, grades III – IV, approved by Ministry of Education Order no. 5003/02.12.2014] http://programe.ise.ro/Portals/1/Curriculum/2014-12/28-Muzica%20si%20miscare_clasele%20a%20III-a%20-%20a%20IV-a.pdf

Petrie, C. (2022a). Interdisciplinary computational thinking with music and programming: a case study on algorithmic music composition with Sonic Pi. *Computer Science Education*, *32*(2), 260-282. https://doi.org/10.1080/08993408.2021.1935603

Petrie, C. (2022b). Programming music with Sonic Pi promotes positive attitudes for beginners. *Computers & Education*, *179*, (p. 13). https://doi.org/10.1016/j.compedu.2021.104409

Plaisier, H., Meagher, T. R., & Barker, D. (2021). DNA sonification for public engagement in bioinformatics. *BMC Research Notes*, *14*(1), 1-4. https://doi.org/10.1186/s13104-021-05685-7

Piteira, M., & Costa, C. (2013). Learning computer programming: study of difficulties in learning programming. In *Proceedings of the 2013 International Conference on Information Systems and Design of Communication*, 75-80. https://doi.org/10.1145/2503859.2503871

Robins, A. (2015). The ongoing challenges of computer science education research. *Computer Science Education, 25*(2), 115-119, doi: https://doi.org/10.1080/08993408.2015.1034350

Rowley, J., & Slack, F. (2004). Conducting a literature review. *Management research news*, *27*(6), 31-39.

Ruiz-Bañuls, M., Gómez-Trigueros, I. M., Rovira-Collado, J., & Rico-Gómez, M. L. (2021). Gamification and transmedia in interdisciplinary contexts: A didactic intervention for the primary school classroom. *Heliyon, 7*(6), e07374. https://doi.org/10.1016/j.heliyon.2021.e07374

Sinclair, A. (2014). Educational Programming Languages: The Motivation to Learn with Sonic Pi. In *PPIG* (p. 14). http://users.sussex.ac.uk/~bend/ppig2014/25ppig2014_submission_23.pdf

Thieme, A., Morrison, C., Villar, N., Grayson, M., & Lindley, S. (2017, June). Enabling collaboration in learning computer programing inclusive of children with vision impairments. In *Proceedings of the 2017 Conference on Designing Interactive Systems*, 739-752.

Traversaro, D., Guerrini, G., & Delzanno, G. (2020). Sonic Pi for TBL Teaching Units in an Introductory Programming Course. In *Adjunct Publication of the 28th ACM Conference on User Modeling, Adaptation and Personalization*, 143-150. https://doi.org/10.1145/3386392.3399317

Váradi, J. (2018). Musical education in the primary schools of Hungary, Romania, Serbia and Slovakia. *Život i škola: časopis za teoriju i praksu odgoja i obrazovanja, 64*(2), 67-75. https://doi.org/10.32903/zs.64.2.5

Vuorikari, R., Kluzer, S., & Punie, Y. (2022). *DigComp 2.2: The Digital Competence Framework for Citizens- With new examples of knowledge, skills and attitudes* (No. JRC128415). Joint Research Centre. Publications Office of the European Union, Luxembourg, ISBN 978-92-76-48882-8. doi:10.2760/115376

Webster, P. R. (2002). Music technology and the young child. In *The arts in children's lives* (pp. 215-236). Springer, Dordrecht.

Wong, W. L., Shen, C., Nocera, L., Carriazo, E., Tang, F., Bugga, S., ... & Ritterfeld, U. (2007). Serious video game effectiveness. In *Proceedings of the international conference on Advances in computer entertainment technology*, 49-55. https://doi.org/10.1145/1255047.1255057

The Role of Negative Emotions in Climate Change Awareness Advertising

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The Role of Negative Emotions in Climate Change Awareness Advertising

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Abstract	
Keywords: emotional appeals; negative emotions; advertising; climate change awareness; behavioural intention.	The field of advertising has been increasingly using psychological concepts to push consumers towards buying and changing their attitudes about the product and even about the whole brand. Accordingly, using emotions as a tool for persuasion and raising behavioural intention should be discussed from a psychological point of view. Therefore, this paper aims to provide an extensive explanation and an experimental proposal for the relationship between three distinct negative emotions and behavioural intention in the context of video advertising. The main advertising concept that we have discussed is the awareness of advertising campaigns, specifically ones on the topic of climate change. In addition, to increase the specificity of the information presented, we analysed several emotions individually: fear, guilt and anger, and their potential of inducing behavioural intention. The three negative distinct emotions were chosen specifically because of the motivational factor that they include, if used in certain conditions, they induce a drive for action, a want for behavioural change - which is preferable in awareness campaigns. We have also discussed some technical details that can be considered important when creating emotional appeals - especially anger, fear or guilt inducing. This paper also offers future directions and represents a guideline for creating emotion inducing advertisements. On top of that, it represents proof that the field of advertising can benefit from research in the psychological field, and that publicity can be used not only as a means for persuading consumers, but also shifting behaviours towards sustainability.

Zusammenfasung	
Schlüsselworte: emotionale Appelle; negative Emotionen; Werbung; Bewusstsein für den Klimawandel; Verhaltensabsichten.	In der Werbung werden zunehmend psychologische Konzepte eingesetzt, um die Verbraucher zum Kauf zu bewegen und ihre Einstellung zum Produkt oder sogar zur gesamten Marke zu ändern. Dementsprechend sollte der Einsatz von Emotionen als Instrument zur Überzeugung und zur Steigerung der Verhaltensabsicht aus psychologischer Sicht diskutiert werden. Daher zielt dieser Beitrag darauf ab, eine umfassende Erklärung und einen experimentellen Vorschlag für die Beziehung zwischen drei verschiedenen negativen Emotionen und der Verhaltensabsicht im Kontext der Videowerbung zu liefern. Das wichtigste Werbekonzept, das wir erörtert haben, ist die Wahrnehmung von Werbekampagnen, insbesondere von solchen zum Thema Klimawandel. Um die Spezifität der dargestellten Informationen zu erhöhen, haben wir außerdem mehrere Emotionen einzeln analysiert: Angst, Schuldgefühle und Wut und ihr Potenzial, Verhaltensabsichten auszulösen. Die drei negativen Emotionen wurden speziell wegen des Motivationsfaktors ausgewählt, den sie beinhalten. Wenn sie unter bestimmten Bedingungen eingesetzt werden, lösen sie einen Antrieb zum Handeln aus, einen Wunsch nach Verhaltensänderung - was bei Sensibilisierungskampagnen wünschenswert ist. Wir haben auch einige technische Details erörtert, die bei der Erstellung von emotionalen Appellen wichtig sind - insbesondere wenn sie Wut, Angst oder Schuldgefühle auslösen. Dieses Papier gibt auch Hinweise für die Zukunft und stellt einen Leitfaden für die Erstellung von emotionsauslösenden Werbungen dar. Darüber hinaus ist er ein Beweis dafür, dass der Bereich der Werbung von der Forschung im psychologischen Bereich profitieren kann und dass Werbung nicht nur als Mittel zur Überzeugung der Verbraucher, sondern auch zur Veränderung des Verhaltens in Richtung Nachhaltigkeit eingesetzt werden kann.

1. Introduction

In recent decades, the concerns for our environment, and whether our planet will be able to keep supporting human life, considering the devastating changes and catastrophes that humans have brought upon it, have been rising. This might be one of the reasons why scientists study the possibility of life on other planets. As there are still major discoveries to be done, and much debate to whether or not this is a good alternative, we can try to opt for the solutions that have been lying in front of us for many years now: to try to undo the harm, to try not to do more harm, and, if all else fails, to try and reduce the harm that we keep doing.

From a psychological point of view, this study aims to shed some light on the topic of using emotions, in general, and negative emotions specifically to create powerful awareness campaigns on the topic of environmental issues and sustainability. The premise is the fact that highly impactful emotional messages have the power to change someone's views, attitudes, and ultimately provide or foster behavioural change

through intention. There has been quite some research on the topic of persuasion by inflicting positive emotions through advertising, that has shown us that positive emotions act indeed as a mediator for changing the subjects' attitude toward the ad (Holbrook & O'Shaughnessy, 1984; Holbrook & Batra, 1987). Lately, the attention has been falling onto negative emotions like guilt, fear, and anger, when it comes to advertising health campaigns, public service announcements or even raising awareness on socio-political causes (Moore & Hoeing, 1989).

The following paper is research done for gaining a better understanding of the use of emotions in the field of advertising, but also regarding the influence of sad emotions (and advertising as a whole) might have when it comes to behavioural changes. We could think of it like studying consumer behaviour, but instead of a product or a service, we're selling behaviour. We have discussed sustainability factors, mechanisms of emotions, as well as the power that those emotions hold on shifting behaviours in awareness advertising.

2. Importance

Our environment is deteriorating, and we're letting it happen, contributing directly to all the health risks this process is putting us through. From minor respiratory inflammation, chronic diseases, lung cancer, acute infections, bronchitis, aggravating pre-existing diseases, asthmatic attacks (Kampa & Castanas, 2008), to stress related disorders, increase in suicide rates, depression, and adjustment disorder (Padhy et al., 2015) that have all been linked to some kind of environment deterioration.

Gifford (2008) puts emphasis on the fact that people individually have a huge responsibility when it comes to sustainability issues. This is because, even if the change needed is one at a higher level - governmental policies programs or regulations, it's still people that change those and that demand change by being informed, and by debating important subjects. Other authors (Veitch, 2008; O'Brien, 2008) take the importance of sustainability further than the health effects we know and link the matter to psychological issues.

For example, O'Brien (2008) argues that sustainable behaviour and decisions in daily life can have a positive outcome on our emotions, increase subjective well-being and implicitly have an impact on our quality of life, by increasing overall health. On the other hand, Veitch (2008) mentions detrimental effects of phonic pollution such as memory impairment and stress. The authors mentioned above both have

expressed a need for further research on an interdisciplinary basis for sustainability. It's been proven to us time and time again that there is an inherent need for change, so the question now becomes why we don't make a change. Perhaps the answer lies in not knowing how, or not knowing where to start, or maybe even in not caring enough.

2.1. A few aspects of environmental sustainability

Sustainability is described, among other definitions, as the avoidance of depletion of natural resources to maintain an ecological balance. In other words, the matter can be described in tight connection to environmental issues, as a quality of producing little to no damage to the environment, the capacity for the biosphere and human civilization to co-exist and maybe also a way of thinking and behaving that is mindful to the effects of human action upon nature and our ecological system. It involves issues like climate change, pollution of natural sources, pollution of oceans, harming of biodiversity, overpopulation, etc. It is important to keep in mind that all the mentioned issues are interconnected, and all contribute to the deterioration of human life as we go on to discuss the implication and costs of some of the above phenomena.

2.2. Climate Change

Humans have had the main influence on climate change, mainly by emitting more and more CO_2 into the atmosphere. This phenomenon is detrimental to our planet, and our health. Climate change comes with a lot of implications, such as extreme weather, natural disasters (fires, floods, tsunamis, hurricanes, etc.), increasing sea levels due to ice melting, desertification, changing rain patterns and many more. All these implications have a very high impact on our lives: people become sicker, lose their homes, water supply is decreasing, etc. (WWF, *Effects of Climate change*).

There is no doubt that Climate change, otherwise known as global warming, is disastrous, but we do have solutions. The WWF gives some solutions to this matter like demanding political action, measuring, and trying to reduce our carbon emissions, changing our lifestyles in a way that is beneficial to our environment. According to the IPCC (Intergovernmental Panel for Climate Change), anthropogenic warming can lead to abrupt and irreversible changes: species at risk of extinction, melting of ice (rise of sea level, inundation of low-lying areas, major coastline changes, etc.), terrestrial vegetation changes, marine ecosystem changes, etc.

One of the solutions they propose is adopting policies that will create incentives for reducing the severity of the changes (mitigation). As this is a topic that implicates social, political, moral issues, changes should be made at a macro level (international policies and agreements), as well as micro (sustainable city-planning, fuel-efficient cars, sustainable transportation) (*Is it too late to prevent climate change? – Climate Change: Vital Signs of the Planet*).

2.3. Pollution

Pollution is the introduction of harmful materials in the environment, in the air, water, soil. Again, as in the case of climate change, pollution is mainly caused by human activity on earth. This means that CO_2 emissions, plastic and oil waste in the oceans, toxic materials dumped on soil, acid rains, etc., they all pollute the Earth. The World Health Organization (WHO) estimates that 90% of people breathe polluted air and as expected, this has major implications on our health, meaning that we are at risk of respiratory infections, heart disease and lung cancer, regardless of the time that we've been exposed to air pollutants (short-term exposure and long-term exposure). Water pollution is also dangerous, causing approximately 14,000 deaths a day, mainly in developing countries, by consumption of contaminated water (Owa, 2013).

As solutions, The World Health Organization states that reducing pollution is everyone's responsibility, from an individual level – by standing up for our rights to sustainable environments, holding our governments accountable, to a community level – by considering public health in public policies, and to national levels – by reducing emissions and setting standards for air quality (*Health consequences of air pollution on populations,* 2019). Some other strategies for managing pollution that can be implemented on an individual level include reducing waste, recycling, reusing, composting (Owa, 2013).

To summarize and, at the same time, paint a complete picture of just how tragic the situation is, we mention that pollution (in all its forms and effects on other factors like climate change), is accountable for a very high percentage of deaths (premature) worldwide. According to The Lancet Commission (2017), in 2015 those numbers were critically high: 16% of deaths worldwide due to pollution. This means that 9 million deaths, a number higher than the one that accounts for deaths due to AIDS, malaria, tuberculosis, but also the number for deaths caused by wars and other types of violence. If this isn't enough, the tragedy continues to be proven, as there are

solutions, and if some of the solutions were to be implemented there are estimates of the numbers being reduced significantly (World Health Organization, 2018).

3. Emotions

Investigating the subject of emotions, we came to the realization that most authors tend to stay away from firmly defining the concept of emotions. This could be a result of the interdisciplinary aspect of emotions, or it could be simply because of the need to expand the concept to a definition that can exclude states that might otherwise be included. Thus, we can describe emotions as being a response of the body to a stimulus, no matter the point of view we look at it from (Frijda, 1986).

In the cognitive field of psychology, emotions are reactions of our thoughts, interpretations, and evaluations (cognitions) of and about a triggering event. Emotions have been generally defined in psychology always linked to other psychological concepts like thoughts, moods, temperament, personality, and stemming from neurophysiological changes. In other words, however we choose to define the concept of emotions, we could never bring them in discussion without understanding their tight links to our biology (nervous system), and the environment we're in.

It is beyond the point of this paper to present every theory about emotion, as there have been quite a few (Cannon, 1987; Schachter & Singer, 1962). However, we will briefly explain and exemplify the following theory, to get a better understanding on the process of emotions.

Lazarus theory (Lazarus, 1982). This theory states that after the stimulus comes cognitive appraisal (what meaning we give to the stimulus, how we perceive it), this appraisal is critical and dependent on personal and socio-cultural factors, and predicts the type of emotion we feel, as well as the type of physiological response our body has. In other words, this theory proposes that the occurrence of events happens in the following order: the stimulus, the cognitive appraisal, and after that the emotion and the physiological changes at the same time. An example could be seeing a stimulus, interpreting the stimulus as dangerous, feeling fear, while the heart rate increases, and experiencing sweat.

The field of neuroscience is also important in understanding the biological basis of emotion, and scientists like Damasio (1994) and LeDoux (1998) had

major contributions in explaining that emotions have a crucial role in rational reasoning and behaviours. Furthermore, the field of evolutionary psychology benefited from the better understanding of emotions, by proposing explanations as to why certain emotions appear in specific situations (Fessler et al., 2004). From an evolutionary point of view, this meant that certain emotions served the purpose of adaptation to evolutionary challenges. The most obvious example would be fear driven behaviours like running away from danger, or living in groups (Poels & Dewitte, 2019).

3.1. Emotions in the field of advertising

As seen so far, emotion is a very complex process, so it is expected that the roles it plays in advertising are diverse. Emotion can be used in a context of moderating attitude toward the ad, attitude toward the product that is being advertised, persuasion or even processing of informational content of the ad (Stewart, Morris & Grover, 2007). Emotions in advertising are usually referred to as "emotional appeal".

Achar et al. (2016) make a pertinent distinction between types of emotions important in the field of advertising: integral emotions and incidental emotions. Integral emotions are the emotional appeals of the ad, designed to provoke an emotion that is strategically chosen by the advertiser, while incidental emotions are those produced by circumstances independent from the decision, but that have potential of influencing decision. There has been an argument in advertising psychology that advertising stimulated emotions are different from real-life emotions, because the first ones are mediated, and therefore do not predict real harm, nor do they bring a benefit to the subject (Poels & Dewitte, 2019). There are, though, experts that proposed that the stimulus should be vivid enough to simulate a real-life situation, thus perceiving the situation as if it was real (Frijda, 1988; Fennis et al., 2011).

Mizerski & White (1986) identified three main uses for emotions in the field of advertising. The first and most obvious one is linking a type of emotion to the brand or product advertised, to influence the consumers' attitude toward the brand (usually creating a sense of security related to the brand). Further on, emotion can be used as a reward for consuming from a certain brand or a certain product. In other words, it could be described as conditioning the consumer to feel a certain way after buying the product or buying from a specific brand (usually, this works with positive emotions – feeling happy about buying chocolate, for

example). Last, but not least, emotions can become a form of strengthening the message/ advertisement, in a way that it is delivered successfully.

In contrast to using emotion for creating a positive attitude toward the brand, using it as a benefit of doing something has a very important component for sustainability: developing behaviours. When used as a benefit of a product, emotion becomes a benefit after the purchase (a specific behaviour), so it could be used, in this case, either as a benefit to purchasing sustainable items, or a benefit to adopting a certain sustainable behaviour (that could not have anything to do with purchase) (Plummer & Holman, 1981). In other words, the emotion-as-benefit approach can be described as teaching the consumer a specific behaviour, to assure the benefit (which in this case, is the emotion itself).

In a quite comprehensive study on emotions in the field of advertising, Mizersky & White (1986), explain some important elements that could answer questions of how to evoke emotions through advertising and, implicitly, influence consumers behaviour. First of all, the ad itself, through portraying events or cues, should evoke at least one type of emotional state in the audience. Second, appraisal plays a very important role in the type of emotion aroused, and last, there should be some pre-existing link in acting a certain way and either altering the emotion or extending it. For example, the ad could arouse guilt in the audience, but it is important for the audience to be involved, for them to appraise the cues a certain way and there should be a pre-existing condition of adopting a certain behaviour to reduce the feeling. If we are to combine the purpose of emotion (or lack of it) as a benefit with the elements we just presented, we should keep in mind reinforcing appropriate responses (as a learning technique), to teach the audience about the benefits of the behaviour, but also to create predispositions for adopting that behaviour (Mizersky & White, 1986). This research also explains the role that different types of learning influences consumer behaviour. For example, vicarious learning is helpful if the goal of the ad is to influence behaviour (observing the models' behaviour can influence our own). Classical conditioning is usually used if the goal is to form an attitude toward the brand and instrumental conditioning is a useful tool when the goal is adopting a behaviour to either alter or prolong a certain emotion.

Although this research aims to emphasize the effect of negative emotions, it is important to note that there are studies that show significant results (in some

types of behaviour) no matter the valence of the emotions (Berger & Milkman, 2012). It is important to mention that a lot of research on the topic of emotional ads has focused on discrete emotions (Poels & Dewitte, 2019). The concept of discrete emotions stems from the idea that there are some basic, well-defined emotions in human psychology that can be expressed similarly and are defined similarly, no matter the cultural or ethnic differences. The emotions proposed by Izard et al. (1993) to be defined as "discrete emotions" are the following: interest, joy, surprise, anger, disgust, contempt, self-hostility, fear, shame, shyness, and guilt.

Emotions, whether studied as arousal, or discrete emotions, have a big impact on our memory, meaning that events or stimuli that hold emotional meaning are remembered better than events that do not (Levine & Pizzaro, 2006). This also affects judgement and behaviour and is very much dependent on the valence of emotions. Studies have shown that negative emotions (e.g. sadness), in contrast to positive ones (e.g. happiness), impact our memory, making us recall facts in a way that is more accurate than in the case of a positive emotional state. In a positive emotional state, general knowledge is used more than actual, accurate statements or events (Bless et al., 1996). In other words, sadness seems to induce a more accurate recollection of facts, than happiness. This happens even though people believe they remember positive events or facts, rather than negative ones, and has to do with the differences in processing information under different emotional states (Levine & Pizzaro, 2006). All these findings are supportive evidence of how the valence of emotion can affect memory, but it is important to note how discrete emotions affect it as well. For example, fear and anxiety can make someone remember threat related information better than threat irrelevant information, sadness makes us recall negative events better (Levine & Pizzaro, 2006). The general idea is that discrete emotions evoke either different types of appraisals or "action tendencies" (Frijda, 1978, apud Levine & Pizzaro, 2006).

Furthermore, emotions can affect our judgment and valence has a role in how we process information, thus, how we make judgments based on emotions. For example, when we feel happy, we tend to judge social situations based on stereotypes and heuristics more than when we are sad or in a neutral state. Also, we become more creative in solving problems when we are happy, in contrast to the analytical and conservative perspective we embrace when we are sad. As we saw in the case of emotion valence, discrete

emotions also take part in judgment differences. Fear, for example, makes individuals highly aware of the possibility of risk, while anger makes them act without considering the risks much. On the other hand, sadness can make someone overestimate the importance of negative events (for example, losses) than other emotions (Levine & Pizzaro, 2006).

3.2. Defining and conceptualizing negative emotions

The main difference when it comes to determining the valence of an emotion has been described through: (a) the valence of the affect - positive emotions feel good, negative emotions feel bad (Damasio, 2003; Isen, 2000); (b) the valence of the behaviour - positive emotions involve approach behaviour, negative emotions involve withdrawal behaviour (Schneirla, 1959; Arnold, 1960); (c) the valence of the object - positive stimuli versus negative stimuli (Cacioppo & Bernston, 1994; Lang et al, 2000). There is also another description that comes closer to the cognitive aspect of emotions: how we evaluate the triggering event determines the valence of the emotion (Colombetti, 2005). Next, we will continue with defining three distinct negative emotions that have been linked with motivational factors, behavioural intention and/ or behavioural change as we will see further on.

3.2.1. Fear

The Cambridge Dictionary gives the following definition of fear: "an unpleasant emotion or thought that you have when you are frightened or worried by something perceived as dangerous, painful, or bad that is happening or might happen". If we consider it from the cognitive psychology point of view, we can argue that fear, being an emotion, is a result of the evaluation of a stimulus/ triggering event. In other words, someone would feel fear when evaluating a stimulus/ event as being dangerous/harmful. The question is how we can use advertising messages in a way that the receiver evaluates the object of the ad dangerous and changes their behaviour in a direction that makes him not be fearful. To give an example, a person would see an ad that raises awareness on the effects of throwing tons of plastic litter into the ocean and decide to reduce the amount of plastic thrown away or bought.

Past literature in the fields of persuasive psychology and advertising psychology has shown quite a mix of results when it comes to fear inducing messages and persuading the receiver, or changes in the behaviours of the receiver. There are plenty of fear-persuasion models, that stand as evidence to the

inconsistency of results: fear acts as a motivational factor to take action (Witte & Allen, 2000), low levels of fear arousal are more persuasive (Goldstein, 1959; Janis & Feshbach, 1953), or even an U shaped curve that indicates either that there are some contextual moderators when it comes to fear persuasion (Boster & Mongeau, 1984; Dillard, 1994) Also, that there is an optimal point of fear that determines persuasion, and any level of fear above that is too high and, therefore, detrimental to persuasion (Janis, 1967). However, some models that focus more on the cognitive aspects of fear have been more successful in finding consistent results (Witte & Allen, 2000; Rogers, 1975, 1983).

Criticism on fear-arousing models has focused on the presumption that flight is the most common response in fear (from the fight or flight response). Thus, an ad would not be able to motivate someone to act in a certain way. This is a pertinent assumption, but if the goal of the ad is for the audience to act in a certain way, the best course of action is to provide a clear plan for the audience (Witte & Allen, 2000). This finding is consistent with the research presented earlier in this paper, showing that altering an emotion can be a motivational component towards acting a certain way. Also, as presented earlier, fear makes people more attentive to threat related information, so when raising awareness, it could be a very effective tool. For example, if we induce fear related to climate change effects in an audience, they might not act immediately (if not presented with a very clear solution), but they might be prone to remember their negative contribution to climate change (as it is threat related information) and act in a different way, to alleviate their fear.

3.2.2. Guilt

This emotion holds a very special place in persuasion psychology because it has an action-motivational component. This means that guilt makes us want to act in ways that will make us stop experiencing it, more than other emotions. In other words, guilt springs from an inconsistency between the action and the principles or values of the person (what they think is right versus what they are doing), so they try to make up for the action that initiated the guilt feeling. For example, if someone believes that it is morally correct to tell the truth, but that person is put in a situation where he/she must behave otherwise, he/she will experience guilt. If the feeling is powerful enough or the event is meaningful enough, that person will try to make up for it.

This is consistent with the responses of people that were asked about their experience with guilt. The responses were: they wished they had acted differently, wanted to make amends, felt responsible (Tangney et al., 1996).

The characteristics of this emotion make it a very powerful one, when it comes to persuasion. Past studies have shown very consistent results, that guilt is indeed a very effective tool in advertising (Coulter & Pinto, 1995; Pinto & Priest, 1991). Guilt appeals must be used rather cautiously, because scientific literature shows us that: (a) moderately explicit guilt appeals have the best results, (b) very explicit guilt appeals have a very high risk of evoking anger, irritation, annoyance – or other negative emotions that interfere with the persuasion process (Coulter et al., 1997; Coulter & Pinto, 1995; Pinto & Priest, 1991).

The answer here is to offer a solution for reducing the guilt (for example, if we were to induce feelings of guilt in someone by bringing awareness to the harsh reality of homeless people's lives, the best result would be obtained if we offered the information that donations to local charities for the homeless have a major impact).

As mentioned before, guilt comes from an inconsistency of one's actions and beliefs and because of this, O'Keefe (2002) notes some similarities between guilt appeals and hypocrisy appeals, that have the same characteristic: they bring attention to oneself' inconsistencies. Although the author presents some studies that had positive results when appealing hypocrisy in participants, he then shows that the results could be explained by their guilt appealing characteristics (rather than dissonance arousal effects). In other words, whether we call it hypocrisy or guilt, the results of drawing attention to inconsistencies between our beliefs/ moral values and our way of acting show promising results.

3.2.3. Anger

This is one of the emotions that could be considered tricky when it comes to advertising, especially when the goal of the ad is to influence the audience in a way that they engage in and commit to certain behaviours. Anger comes from the evaluation that an event is blocking our way of attaining our goals, or from having our personal rights violated. A coping mechanism for anger is that it becomes a motivational factor for us to act in such a way that we regain control of the situation, so we can attain our goals and/or express our rights (Lazarus & Lazarus, 1994). This is where self-efficacy becomes important.

As individuals, we are more likely to do something if we believe we can do it. A person with higher levels of self-efficacy will be more likely to engage and commit to a behaviour (having faith that they can accomplish their goal), than a person with lower levels of self-efficacy (we are unlikely to do something if we don't believe we can – feeling like it would be a waste of time).

As mentioned above, it is already very clear that anger can result in negative outcomes when the goal is persuasion. Questioning this matter, Turner (2007) developed the *Anger Activism Model*, as a means for explaining when anger results in positive persuasive outcomes. The AAM proposes that anger can have persuasive abilities depending on the intensity of the emotion, but also considers self-efficacy matters. Turner (2007) proceeded to split the audience of the anger inducing advertisements into four groups, divided by the intensity of the anger and the level of perceived efficacy: a. the *activists* – the group with the strongest levels of anger and highest level of efficacy beliefs; b. the *empowered* – the group with low levels of anger stimulation, but high levels of self-efficacy; c. the *angry* – the group with high levels of anger aroused, but low levels of perceived efficacy and d. the *disinterested* – with low levels of fear aroused and low levels of self-efficacy. As expected, the author found out that the first group had the best results: they had the most amount of cognitive processing of the message and were most likely to engage in high commitment behaviour. The empowered group, although likely to engage in high commitment behaviours, was not angry about the topic, meaning that there was little cognitive processing of the matter (for example, "why should I do something about a matter that I don't really care about"). In contrast, the angry group, had very strong feelings about the topic, but they didn't believe they could do something about it, fact that resulted in not being likely to engage in high commitment behaviours (for example, "I care about the matter a lot, but I can't do anything about it"). Finally, the disinterested group had neither the feeling, nor the belief that they could do something about it, so they had the least amount of cognitive processing (for example, "I don't care").

3.3. How to induce emotions

There are different means to induce emotions, and the most known being imagination, facial expressions, social interactions, films, images, text, etc. These have been used in the past in laboratory conditions to study various aspects of emotions. We will mainly focus on presenting research on inducing emotions via films (or videoclips), as it has been argued to be one of the most effective ways, and is more relevant to this study, compared to other methods. We do acknowledge the fact that advertisements can also be written, appear in the form of images (e.g. poster advertisements), or can be in audio form, but for the purpose of this study we have decided to study mainly video advertisements in appealing emotions (Hewig et al., 2005).

Going back to where we presented the mechanism of emotions, we remember that for an emotion to spark, we need a stimulus or a triggering event. This event could range from being as little as a subliminal stimulus, or as wide as a whole combination of different stimuli. A subliminal stimulus could be, for example, a word presented very briefly, in a time that is too short for conscious perception, but can still be present in the subconscious, and that can activate cognitive schema. On the other hand, triggering events can be combinations of subliminal and conscious stimuli such as an image that is perceived, but is presented with a certain light filter on it. To further exemplify how subliminal stimuli work, we will briefly present the results of a study conducted on the issue of eating habits. Meyer & Waller (1999) presented different subliminal messages in the form of words presented to different groups in 4ms frames (under the perceptual threshold), and the results showed that some groups had significantly different outcome behaviours, although none of the groups was able to detect the word presented.

As a rule, when trying to artificially induce emotions, it is very important to stay true to and understand the mechanism of each distinct emotion. Asking "what makes this emotion different from another?", could be very useful in building stimuli. As we've seen above, presenting the three distinct emotions this study focuses on (fear, guilt, anger), there are some key differences in the way that emotions are sparked or in the way they make people act, motivating in a way or another.

Particularly, fear is a response to a perceived danger, so when trying to elicit this emotion, it is important to include images, written or spoken text that explicitly describes direct danger. Skurka et al. (2018), in a study concerning emotional appeals in relation to climate change, constructed fear appeals by using cues that portrayed the catastrophic effects of climate change (images and videoclips), with a voiceover that reinforced the threatening aspect of the clip, made in a serious voice, with a background of

sinister music. If we were to follow the same pattern, in the case of guilt, we would consider presenting the same facts as in the fear appeal, while trying to reinforce the feeling of inconsistency between the viewer's beliefs and actions. Perhaps a good idea would be to personalize the ad, in comparison to the fear appeal, making the statements personal, using pronouns or other means (placing fault on the viewer). Further on, anger appeals, following the same model, could be presented by fortifying the obstructive aspect to one's goals of the events presented in the ad. For example, the ad should be built in a way that emphasizes the effects of environmental catastrophes on a goal that is general to the population, such as quality of life, high life expectancy, health, etc.

An explanation as to why negative emotions were chosen for this study, rather than positive ones, is the fact that negative valence events have a bigger impact on our life than do positive valence ones. Portraying this phenomenon, Baumeister et al. (2001), wrote an article that explains the effects of "bad" being "stronger than good". This is applicable in various areas of life. For example, reactions to events seem to be stronger in the case of negative events. Also, if we think about learning and conditioning, punishments tend to be the most rapid way to learn and, in decision making, people tend to choose to avoid aversive stimuli. Another relevant example, cited in the study mentioned above (Baumeister et al., 2001) is Gottman's (1994) study, finding that in close relationships, negative events have effects 5 times stronger than positive ones.

Returning to emotions, Baumeister's study showed that, we have more words for describing negative emotions, in comparison to positive ones, as well as more mechanisms of emotion-regulation for negative emotions. In addition, negative emotions seem to be more prominent in our minds. Perhaps the most relevant idea of the study is the fact that negative emotions are processed in more depth rather than positive ones and have stronger effects on the behaviour (Baumeister et al., 2001).

4. Conclusions

We can conclude on some guidelines that might prove themselves to be quite effective in creating awareness campaigns. The first important aspect to consider is to personalise the ad relative to the emotion that you are trying to induce. For the three emotions presented in this paper, it is important to remember that: fear is a reaction to triggers perceived as dangerous, guilt is a reaction to perceived

inconsistencies between one's beliefs and actions, and anger is a reaction to a trigger that is received as goal-blocking. Another very important aspect, especially when working with negative emotions, is to keep the emotional appeal intensity at a certain threshold - as a very intense or not intense enough emotion can be harmful to the purpose of persuasion. On the other hand, it is necessary that the advertisement provides a clear plan of action, for the audience to have a way of channelling the emotion into action, or otherwise it can become overwhelming.

As a general conclusion, the ideas summarised in this paper show consistent evidence that negative emotions can be used as a powerful tool for persuading an audience, especially in awareness campaigns.

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References

Achar, C., So, J., Agrawal, N., & Duhachek, A. (2016). What we feel and why we buy: the influence of emotions on consumer decision-making. *Current Opinion in Psychology*, *10*, 166-170.

Arnold, M.B. (1960), *Emotion and Personality. Vol.1: Psychological Aspects* (New York: Columbia University Press).

Baumeister, R. F., Bratslavsky, E., Finkenauer, C., & Vohs, K. D. (2001). Bad is stronger than good. *Review of general psychology*, *5*(4), 323-370.

Berger, J., & Milkman, K. L. (2012). What makes online content viral?. *Journal of marketing research*, *49*(2), 192-205.

Bless, H., Clore, G. L., Schwarz, N., Golisano, V., Rabe, C., & Wölk, M. (1996). Mood and the use of scripts: Does a happy mood really lead to mindlessness?. *Journal of personality and social psychology*, *71*(4), 665.

Boster, F. J. & Mongeau, P. (1984). Fear-arousing persuasive messages. In R. N. Bostrom (Ed.), Communication Yearbook 8, (pp. 330-375). Beverly Hills, CA: Sage.

Cacioppo, J.T. & Berntson, G.G. (1994), 'Relationship between attitudes and evaluative space: A critical review, with emphasis on the separability of positive and negative substrates', *Psycho- logical Bulletin,* **115**, pp. 401–23.

Cannon, W. B. (1987). The James-Lange theory of emotions: a critical examination and an alternative theory. *The American journal of psychology*, *100*(3/4), 567-586.

Colombetti, G. (2005). Appraising Valence. *Journal of Consciousness Studies*, *12*(8-10), 103-26.

Coulter, R. H., Cotte, J., & Moore, M. L. (1997). Guilt appeals in advertising: Are you feeling guilty. In *Winter Marketing Educators' Conference Proceedings* (pp. 109-115).

Coulter, R. H., & Pinto, M. B. (1995). Guilt appeals in advertising: what are their effects?. *Journal of applied Psychology*, *80*(6), 697.

Damasio, A. R. (1994). Descartes' Error. Emotion, Reason and the Human Brain. New York (Grosset/Putnam) 1994.

Damasio, A.C. (2003), *Looking for Spinoza: Joy, Sorrow, and the Feeling Brain* (Orlando: Harcourt).

Dillard, J. P. (1994). Rethinking the study of fear appeals: An emotional perspective. Communication Theory, 4, 295-323.

Effects Of Climate Change. (n.d.). Retrieved December 05, 2020, from https://www.wwf.org.uk/learn/effects-of/climate-change

Fennis, B. M., Adriaanse, M. A., Stroebe, W., & Pol, B. (2011). Bridging the intention–behavior gap: Inducing implementation intentions through persuasive appeals. *Journal of Consumer Psychology*, *21*(3), 302-311.

Fessler, D. M., Pillsworth, E. G., & Flamson, T. J. (2004). Angry men and disgusted women: An evolutionary approach to the influence of emotions on risk taking. *Organizational behavior and human decision processes*, *95*(1), 107-123.

Frijda, N. H. (1986). *The emotions*. Cambridge University Press.

Frijda, N. H. (1988). The Laws of Emotion.

Gifford, R. (2008). Psychology's essential role in alleviating the impacts of climate change. *Canadian Psychology/psychologie canadienne*, *49*(4), 273.

Goldstein, M. J. (1959). The relationship between coping and avoiding behavior and response to fear- arousing propaganda. *Journal of Abnormal and Social Psychology*, 58, 247-252.

Health consequences of air pollution on populations. (2019, November 15). Retrieved December 03, 2020, from https://www.who.int/news/item/15-11-2019-what-are-health-consequences-of-air-pollution-on-populations

Hewig, J., Hagemann, D., Seifert, J., Gollwitzer, M., Naumann, E., & Bartussek, D. (2005). A revised film set for the induction of basic emotions. *Cognition and emotion*, *19*(7), 1095.

Holbrook, M. B., & Batra, R. (1987). Assessing the role of emotions as mediators of consumer responses to advertising. *Journal of consumer research*, *14*(3), 404-420.

Holbrook, M. B., & O'Shaughnessy, J. (1984). The role of emotion in advertising. *Psychology & Marketing*, *1*(2), 45-64.

Is it too late to prevent climate change? – Climate Change: Vital Signs of the Planet. (n.d.). Retrieved December 05, 2020, from https://climate.nasa.gov/faq/16/is-it-too-late-to-prevent-climate-change/

Izard, C. E., Libero, D. Z., Putnam, P., & Haynes, O. M. (1993). Stability of emotion experiences and their relations to traits of personality. *Journal of personality and social psychology*, *64*(5), 847.

Janis, I. L. (1967). Effects of fear arousal on attitude change: Recent developments in theory and experimental research. *Advances in Experimental Social Psychology, 3*, 167-225.

Janis, I.L., & Feshbach, S. (1953). Effects of fear-arousing communications. *Journal of Abnormal and Social Psychology, 48*(1), 78-92.

Kampa, M., & Castanas, E. (2008). Human health effects of air pollution. *Environmental pollution*, *151*(2), 362-367.

Lang, P.J., Davis, M. and Öhman, A. (2000), 'Fear and anxiety: Animal models and human cognitive psychophysiology', *Journal of Affective Disorders,* **61**, pp. 137–59.

Lazarus, R. S., & Lazarus, B. N. (1994). *Passion and reason: Making sense of our emotions*. Oxford University Press, USA.

Lazarus, R. S. (1982). Thoughts on the relations between emotion and cognition. *American psychologist*, *37*(9), 1019.

LeDoux, J. (1998). *The emotional brain: The mysterious underpinnings of emotional life*. Simon and Schuster.

Levine, L. J., & Pizarro, D. A. (2006). Emotional valence, discrete emotions, and memory. *Memory and emotion: Interdisciplinary perspectives*, 37-58.

Meyer, C., & Waller, G. (1999). The impact of emotion upon eating behavior: The role of subliminal visual processing of threat cues. International Journal of Eating Disorders, 25(3), 319-326.

Mizerski, R. W., & White, J. D. (1986). Understanding and using emotions in advertising. *Journal of Consumer Marketing*.

Moore, D. J., & Hoenig, S. (1989). Negative emotions as mediators of attitudes in advertising appeals. *ACR North American Advances*.

O'Brien, C. (2008). Sustainable happiness: How happiness studies can contribute to a more sustainable future. *Canadian Psychology/Psychologie canadienne*, *49*(4), 289.

O'Keefe, D. J. (2002). Guilt as a mechanism of persuasion. *The persuasion handbook: Developments inc. theory and practice*, 329-344.

Owa, F. D. (2013). Water pollution: sources, effects, control and management. Mediterranean journal of social sciences, 4(8), 65.

Padhy, S. K., Sarkar, S., Panigrahi, M., & Paul, S. (2015). Mental health effects of climate change. *Indian journal of occupational and environmental medicine*, *19*(1), 3.

Pinto, M. B., & Priest, S. (1991). Guilt appeals in advertising: An exploratory study. *Psychological Reports*, *69*(2), 375-385.

Plummer, J., & Holman, R. (1981). Communicating to the heart and/or mind. *Los Angeles, CA: American Psychological Association*.

Poels, K., & Dewitte, S. (2019). The role of emotions in advertising: a call to action. *Journal of Advertising*, *48*(1), 81-90.

Rogers, R. W. (1975). A protection motivation theory of fear appeals and attitude change. *Journal of Psychology*, 91, 93-114.

Schachter, S., & Singer, J. (1962). Cognitive, social, and physiological determinants of emotional state. *Psychological review*, *69*(5), 379.

Schneirla, T.C. (1959), 'An evolutionary and developmental theory of bi-phasic processes underlying approach and withdrawal', in *Nebraska Symposium on Motivation*, ed. M.R. Jones (Lin- coln: University of Nebraska Press).

Skurka, C., Niederdeppe, J., Romero-Canyas, R., & Acup, D. (2018). Pathways of influence in emotional appeals: Benefits and tradeoffs of using fear or humor to promote climate change-related intentions and risk perceptions. *Journal of Communication*, *68*(1), 169-193.

Stewart, D. W., Morris, J., & Grover, A. (2007). Emotions in advertising. *The Sage handbook of advertising*, 120-134.

Tangney, J.P., Miller, R.S, Flicker, L. & Barlow, D.H., (1996). Are shame, guilt and embarrassment distinct emotions? *Journal of Personality and Social Psychology,* 70, 1256-1269.

Turner, M. M. (2007). Using emotion in risk communication: The anger activism model. *Public Relations Review*, *33*(2), 114-119.

Veitch, J. A. (2008). Investigating and influencing how buildings affect health: Interdisciplinary endeavours. *Canadian Psychology/Psychologie canadienne*, *49*(4), 281.

Witte, K., & Allen, M. (2000). A meta-analysis of fear appeals: Implications for effective public health campaigns. Health Education and Behaviour, 27(5), 608-632.

World Health Organization (WHO), 2018. Inheriting a Sustainable World? Atlas on Children's Health and the Environment. WHO, Geneva Available at:. http://www. who.int/ceh/publications/inheriting-a-sustainable-world/en/, Accessed date: 28 January 2021

Zajonc, R. B. (1980). Feeling and thinking: Preferences need no inferences. *American psychologist*, *35*(2), 151.

Relationship between Achievement Goal Orientation, Fear of Failure and Academic Performance

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Relationship between Achievement Goal Orientation, Fear of Failure and Academic Performance

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Abstract	
Keywords: achievement goal orientation; fear of failure; academic performance.	There is considerable empirical support for the study of factors that positively or negatively influence academic performance, including achievement goal orientation and fear of failure. According to research, fear of failure can, in some situations, threaten students' academic performance by affecting their engagement in learning activities. If remedial action is not taken to reduce it, this can affect students academic future. At the same time, earlier research has indicated that fear of failure influences thenature of achievement goals that students pursue. Nevertheless, there is a scarcity of studies that have explored the connection interplay between learning goal orientation, the fear of failure, and academic achievement. Based on data from 120 university students, we conducted correlational analyses to test the relationships between achievement goal orientation, fear of failure and academic performance. The findings showed significant correlations between fear of failure and mastery-avoidance goal, as well as between students' academic performance. Pedagogical implications and future research directions were discussed.

Zusammenfasung	
Schlüsselworte: Lernzielorientierung; Versagensangst; schulische Leistungen.	Es gibt zahlreiche empirische Belege für die Untersuchung von Faktoren, die sich positiv oder negativ auf die schulischen Leistungen auswirken, einschließlich der Lernzielorientierung und der Angst vor Misserfolg. Die Forschung zeigt, dass Versagensängste in bestimmten Situationen die akademischen Leistungen von Schülern gefährden können, da sie deren Engagement bei Lernaktivitäten beeinträchtigen. Werden keine Gegenmaßnahmen ergriffen, kann dies die akademische Zukunft der Schüler beeinträchtigen. Gleichzeitig haben frühere Studien gezeigt, dass Versagensängste die Art und Weise beeinflussen, wie Studierende ihre Lernziele verfolgen. Es gibt jedoch nur wenige Studien, die den Zusammenhang zwischen Lernzielorientierung, Versagensangst und Studienerfolg untersucht haben. Basierend auf den Daten von 120 Universitätsstudenten haben wir Korrelationsanalysen durchgeführt, um die Zusammenhänge zwischen Lernzielorientierung, Versagensangst und akademischer Leistung zu testen. Die Ergebnisse zeigten signifikante Korrelationen zwischen Versagensangst und dem Ziel der Meisterschaftsvermeidung sowie zwischen dem Mittelwert der Studierenden und dem Ziel der Leistungsorientierung. Pädagogische Implikationen und zukünftige Forschungsrichtungen wurden diskutiert.

1. Introduction

Timely completion of academic tasks can be influenced by several factors, both internal, such as laziness, procrastination, task difficulty, and external, such as the characteristics of the work environment. Given the limited number of studies that have examined the interplay between achievement goal orientation, fear of failure, and academic performance, our study seeks to examine these associations and add valuable insights to the existing literature in this area. Therefore, we refer to the theory of achievement goal orientation (Dweck, 1986), recognized as one of the most popular and widely accepted frameworks of motivation in learning. In this context, the authors argue that individuals with a focus on mastery-approach goals are intrinsically motivated to enhance their abilities and show a higher level of confidence in their own abilities, whereas individuals oriented towards performance-avoidance goals are more likely to procrastinate due to fear of failure (Lin et al., 2021). A study by Solomon and Rothblum (1984) found that fear of failure leads to procrastination. Thus, individuals with low levels of confidence in their own abilities may have a greater fear of failure and therefore prefer to procrastinate academic tasks, which could lead to poor performance. The aim of this study was to investigate the association between achievement goal orientation, the fear of failure, and academic performance, as measured by the average of the previous academic year, using correlational analyses.

2. Theoretical foundation

Fear of failure arises from achievement goal theory and is an emotional and motivational trait that is

expressed in the tendency to avoid situations that might lead to failure in order to avoid feelings of embarrassment or shame (Atkinson, 1957; Caraway & et al., 2003; Sagar & Stoeber, 2009). Along with hope to succeed, fear of failure falls into the category of achievement motives because it directs students towards possible positive or negative outcomes (Atkinson, 1957; McClelland, 1985). This feeling often arises in situations where individuals lack confidence in their own abilities or competencies necessary to achieve their goals (De Castella et. al., 2013). Previous experiences ending in success or failure guide an individual's future behaviour and decisions, creating an attitude to approach or avoid a particular event (Elliot & Covington, 2001). Some authors argue that fear of failure is not a genetic trait, but increases with age due to environmental influences (Meyza et al., 2011; Schayek & Maroun, 2015). Regarding the causes that determine this fear, Giel et al. (2020) argue that fear of failure can have both internal causes, resulting from personal characteristics, and external causes, resulting from interactions with the external environment. Authors such as Conroy et al. (2002) and Martin and Marsh (2003) argue that fear of failure can serve as a motivator for excellence, yet it can also inhibit individuals from attaining their maximum potential by inducing elevated levels of anxiety. For example, individuals with high levels of fear of failure tend to generalise failure across performance contexts (McGregor & Elliot, 2005). The literature shows that students' fear of failure has a significant impact on intrinsic motivation, academic procrastination, learning behaviour and student achievement (Caraway et al., 2003; Chen et al., 2009; Haghbin et al., 2012).

The authors first categorized achievement goal orientation into two distinct types: (1) learning goal orientation, which focuses on skill development through learning, and (2) performance goal orientation, which includes the desire to demonstrate skills to others and to avoid situations in which others might perceive him or her as incapable (Dweck, 1986). Seijts et al. (2004) argue that learning-goal orientated learners engage in challenging tasks that provide them with opportunities to develop their skills, whereas learners oriented toward performance-goals concentrate on achieving final outcomes, experience fear of failure, and focus on the repercussions of low performance (Button et al., 1996). Over time, the classification of learning goals has undergone several variations and has been a topic of interest to educational researchers. These have evolved from the

two main categories – mastery-oriented and performance-oriented goal (Dweck & Leggett, 1988), to three categories - mastery goal orientation, performance-approach and performance-avoidance goal orientation (Elliot & Church, 1997), and finally to four categories – mastery-approach and mastery-avoidance goal, and performance-approach and performance-avoidance goal (Elliot & McGregor, 2001). In our research, we will utilize the categorization of learning goals as suggested by Elliot and McGregor (2001), encompassing the four distinct types of goal orientation and their abbreviations: (1) performance-approach goal (PAP), involving the demonstration and validation of competence by learners who are concerned with outperforming others; (2) performance-avoidance goal (PAV), relating to the prevention of situations that could lead to failure or underperformance by peers; (3) mastery-approach goal (MAP, which is reflected by students' concern to enrich their knowledge, develop their personal skills, abilities and aptitudes; and (4) mastery-avoidance goal (MAV), which involves the avoidance of misunderstandings and sometimes even tasks, due to lack of confidence in their ability to perform them successfully (Diaconu-Gherasim & Măirean, 2016; Wolters, 2004). Motivation theorists have included fear of failure in the category of antecedents of goal attainment, alongside the need for achievement or perfectionism (Maehr, 2001; Puente-Díaz, 2013).

Elliot and Pekrun (2007) argue that individuals with high levels of fear of failure engage in academic tasks with the fear that they might fail and that they might feel shame after the experience, which could lead to the adoption of a form of defensiveness focused on avoiding negative outcomes. Results from several previous studies confirm the connection between fear of failure and learning goal orientation (Conroy & Elliot, 2004; Elliot & Church, 1997). These authors argue that individuals who demonstrate a fear of failure are either focused on escaping underperformance compared to their peers or they are focused on avoiding falling behind their peers, thereby adopting PAV and MAV goals. For instance, the results of their studies showed positive correlations between fear of failure and MAP and PAV. Additionally, there were weaker but still notable correlations between fear of failure and PAP. Results from other studies (Dinger et al., 2013; Elliot & Murayama, 2008) showed that fear of failure was a predictor of both MAV and PAV goals. However, Caraway et al., (2003) argue that individuals

exhibiting high levels of fear of failure and low levels of self-efficacy are less able to set goals and work towards achieving them, and therefore less engaged in school tasks.

The relationship between achievement goals and academic performance has been explored in numerous studies, with MAP (Cerasoli & Ford, 2014; Keys et al., 2012), MAV (Elliot & McGregor, 2001; Luo et al., 2013) and PAP goals (Dinger et al., 2013) being positively associated with academic achievement. Conversely, other studies provide evidence of a negative association between PAP (Luo et al., 2013), PAV (Dinger et al., 2013; Elliot & Church, 1997; Luo et al., 2013) and academic performance. The findings regarding the connection between fear of failure and academic performance are mixed. Some studies found a significant correlation between fear of failure and academic performance (Alkhazaleh & Mahasneh, 2016), while others found no significant correlation between the two (Nair & Sutar, 2023). Furthermore, the findings of the study conducted by Dinger et al. (2013) indicate that fear of failure can have an indirect impact on academic performance. It has a positive influence through PAP and a negative influence through PAV goal.

3. Research methodology

The current study aims to investigate the relationship between learning goal orientation, fear of failure and academic outcomes in undergraduate students. Based on previous literature, the following research hypotheses were tested: (1) Fear of failure is expected to be positively correlated with PAP, MAV, and PAV goals; (2) Fear of failure is expected to be significantly correlated with academic performance; (3) PAV and MAP goal will be positively correlated with academic performance.

Research participants. 120 undergraduate students from a large Romanian university, aged 18-58 years ($M=21.3$, $SD=5.79$), participated voluntarily in this study. Of these, 15.8% were female and 84.2% were male. Participants in this study were recruited from a pedagogy course and, for their participation in the study, they were rewarded with extra credit in the course.

Instrument. To assess *fear of failure* we used the short version of the Performance Failure Appraisal Inventory (Conroy et al., 2002), which consists of 5 items (e.g. 'When I am failing, I worry about what others think of me') measured on a 5-point Likert scale (1 = I don't believe it at all, 5 = I believe it 100%). The

Alpha Cronbach internal consistency coefficient is .820.

Learning goal orientation was measured using the Achievement Goal Questionnaire (AGQ; Elliot & McGregor, 2001) with four scales: mastery-approach goal (3 items; e.g., "My goal is to completely master the material presented in class"); mastery-avoidance goal (3 items; e.g., "My goal is to avoid learning less than I possibly could"); performance-approach goal (3 items; e.g., "My aim is to perform well relative to other students"); performance-avoidance goal (3 items; e.g., "My goal is to avoid learning less than I possibly could"). e.g. 'My goal is to avoid learning less than I could'); performance-approach goal (3 items; e.g. 'My goal is to perform well compared to other students'); performance-avoidance goal (3 items; e.g. 'My goal is to avoid performing poorly compared to others'). Participants responded to questions using a 7-point Likert scale (from 1 = *not at all true for me* to 7 = *very true for me*). Cronbach's alpha coefficient of internal consistency shows good values for all four scales ($\alpha_{PAP} = .891$; $\alpha_{PAV} = .760$; $\alpha_{MAV} = .703$; $\alpha_{MAP} = .790$).

Academic performance was assessed by the grade point average achieved in the last year of study and was self-reported by the students.

Data collection. The instruments were administered online, together with a questionnaire containing socio-demographic data (gender, age). The grade point average of the previous academic year was reported by the participants. Students were informed that participation was voluntary and that their responses would be kept confidential.

Data Analysis. The present study was descriptive-correlational and examined the relationship between learning goal orientation, fear of failure and academic achievement. IBM SPSS was used to analyse the data. T-test was used to compare variables between females and males, and Pearson's r-correlations were applied to analyse the relationships among learning goal orientation, fear of failure and academic achievement, as well as the relationships between age and study variables.

4. Results

4.1. Preliminary analyses

In Table 1 the means scores, standard deviations and scale reliabilities (Cronbach's α) for all variables are presented. All alpha coefficients exceeded .70, indicating a satisfactory level of scale reliability.

Table 1. Mean, Standard Deviation and Scale Reliabilities for All Variables

Variables	M	SD	α
Fear of failure	13.86	4.82	.820
MAp	12.05	2.60	.790
MAv	10.17	2.88	.703
PAp	9.78	3.22	.891
PAv	10.79	3.07	.760

Note: Map = mastery-approach goal, Mav = mastery-avoidance goal, Pap = performance-approach goal, Pav = performance-avoidance goal.

N=120

Table 2 displays the results of the independent samples t-tests, which indicate that there are no notable distinctions between females and males in terms of Fear of Failure, MAP, MAV and PAP goal. In contrast, the results show that there are significant differences between males and females on PAV, with girls scoring higher than boys.

Table 2. T-test results for variables in both males and females

Variables	Males		Females		df	t	p
	M	SD	M	SD			
1. Fear of failure	11.89	4.82	14.23	4.76	118	-1.964	.052
2. MAp	11.63	2.73	12.13	2.58	118	-.777	.439
3. MAv	9.36	3.09	10.32	2.83	118	-1.331	.186
4. PAp	9.36	3.45	9.86	3.19	118	-.609	.544
5. PAv	9.52	3.48	11.02	2.94	118	-1.980	.050

Note: MAp = mastery-approach goal, MAv = mastery-avoidance goal, Pap = performance-approach goal, PAv = performance-avoidance goal.

The correlations with age for each study variable are shown in Table 3. The results indicate only one significant correlation, between subjects' age and MAP (p = .038), in that subjects with high age scores have high MAP scores and reciprocally, subjects with low age scores have low MAP scores.

Table 3. Pearson correlation between age and study variables

	1	2	3	4	5	6
1. Fear of failure						
2. MAp	-.054					
3. MAv	.445**	.309**				
4. PAp	.124	.338**	.151			
5. PAv	.128	.302**	.315**	.470**		
6. Age	-.113	**.190***	-.030	.047	-.021	

* p < .05 , ** p < .01

4.2. Associations between main study variables

The Pearson correlations results between fear of failure, learning goal orientation, and academic performance are presented in Table 4.

Table 4. Pearson correlation between the study variables

	1	2	3	4	5	6
1. Fear of failure						
2. MAp	-.054					
3. MAv	.445**	.309**				
4. PAp	.124	.338**	.151			
5. PAv	.128	.302**	.315**	.470**		
6. Academic performance	-.091	-100	.034	.261**	.035	

Note: MAp = mastery-approach goal, MAv = mastery-avoidance goal, PAp = performance-approach goal, PAv = performance-avoidance goal.

**p<.05

Pearson correlation results indicate that fear of failure is not statistically significantly correlated with PAP, PAV, and MAP goal (p > .05). On the contrary, a statistically significant positive correlation was observed between fear of failure and MAV (p < .05), in that subjects with high fear of failure scores had high MAV scores, and reciprocally, subjects with low MAV scores had low fear of failure scores.

Regarding the connection between study variables and academic performance, the findings of the current study indicate that there is no statistically significant correlation between academic performance and fear of failure (p = .324), PAV (p = .705), MAV (p = .709), or MAP (p = .279). The only significant correlation observed was between academic performance and PAP (p = .004).

5. Discussions and conclusions

This study was aimed at exploring the association between learning goal orientation, fear of failure, and academic achievement. The first hypothesis of our study was partially confirmed, as fear of failure was only significantly correlated with the MAV, but not with the PAP and PAV goals. The results of the study by Chen et al. (2009) and Conroy and Elliot (2004) also indicate a significant correlation between fear of failure and the MAV. In contrast to our findings, the results of previous studies (Chen et al., 2009; Conroy & Elliot, 2004) indicate a significant correlation between fear of failure and PAV, and in Conroy and Elliot's (2004) study, fear of failure predicted PAP.

Avoidance of situations in which the student may not fully understand the information, as well as lack of confidence in their own abilities (Diaconu-Gherasim & Măirean, 2016; Elliot, 1999), may be caused by fear of failure. At the same time, Conroy & Elliot (2004) contend that fear of failure raises the probability that students will adopt avoidance goals, driven by their fear of experiencing shame or embarrassment or, as Elliot (1999) argues, a desire to avoid situations that may demonstrate a lack of competence. In addition, Chen et al. (2009) argue that individuals who experience fear of failure are more inclined to adopt avoidance goals that are worse than their previous performance (mastery-avoidance goal) or that of their peers (performance-avoidance goal). Additionally, Chen et al. (2009) suggest that fear of failure might motivate students to demonstrate their competence by pursuing a performance-approach goal, thereby potentially reducing the risk of failure.

In contrast to the findings of Nair and Sutar (2023), the results of our study indicate that there is no significant correlation between fear of failure and students' overall GPA. However, based on the study conducted, Berger and Freund (2017) argue that during exam preparation, fear of failure affects students' well-being and makes it difficult to pursue the set goals. Contrary to our findings, Alkhazaleh and Mahasneh (2016) identified a significant association between fear of failure and academic achievement.

Regarding the relationship between academic performance and learning goal orientation, the results of our findings show only one significant correlation, which is between GPA and PAP. The results of the study by Dinger et al. (2013) similarly support the association between academic achievement and PAP. Consistent with our findings, Bipp and van Dam (2014) did not find a significant correlation of academic performance with PAV and MAP goals, respectively. In our study, no significant differences were found between girls and boys in their fear of failure.

Limitations and future research directions

One potential limitation of our study could be the correlational design, which does not allow causality to be established. Therefore, further studies with an experimental design are needed to verify causality. Another limitation of our study could be the small number of participants and their field of study, which could prevent the generalisations of the results to subjects of different age, education, culture, etc. Future research could include students from other faculties and disciplines, as well as international students, so that the data collected is as diverse as possible. The collection of data through self-report instruments and the optional nature of the participation in the study could be other limitations of our research, as it is possible that students with a fear of failure may not have wanted to participate in the study, thus reducing the sample size.

Regarding future research on this topic, we consider it necessary to conduct more studies that investigate the 2x2 theoretical framework of learning goal orientation in relation to students' fear of failure and academic performance, and also to identify practical solutions to reduce students' fear of failure and, in particularly, to support students' learning goal orientation. Increased confidence in competence levels could lead to increased engagement in academic tasks and reduced fear of failure. This can be achieved by providing constant positive feedback.

Authors note:

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References

Alkhazaleh, Z. M., & Mahasneh, A. M. (2016). Fear of failure among a sample of Jordanian undergraduate students. *Psychology research and behavior management, 53*-60. https://doi.org/10.2147/PRBM.S96384

Atkinson, J. W. 1957. "Motivational Determinants of Risk-Taking Behavior." *Psychological Review 64* (6): 359–72.

Berger, S., & Freund, A. M. (2012). Fear of failure, disorganization, and subjective well-being in the context of preparing for an exam. Swiss Journal of Psychology. https://doi.org/10.1024/1421-0185/a000074

Bipp, T., & van Dam, K. (2014). Extending hierarchical achievement motivation models: The role of motivational needs for achievement goals and academic performance. *Personality and Individual Differences*, *64*, 157-162. 10.1016/j.paid.2014.02.039

Button, S. B., Mathieu, J. E., & Zajac, D. M. (1996). Goal orientation in organizational research: A conceptual and empirical foundation. *Organizational behavior and human decision processes*, *67*(1), 26-48. 10.1006/obhd.1996.0063

Cerasoli, C. P., & Ford, M. T. (2014). Intrinsic motivation, performance, and the mediating role of mastery goal orientation: A test of self-determination theory. *The Journal of psychology, 148*(3), 267-286. https://doi.org/10.1080/00223980.2013.783778

Conroy, D. E., & Elliot, A. J. (2004). Fear of failure and achievement goals in sport: Addressing the issue of the chicken and the egg. *Anxiety, Stress & Coping*, *17*(3), 271-285. https://doi.org/10.1080/1061580042000191642

Caraway, K., Tucker, C. M., Reinke, W. M., & Hall, C. (2003). Self-efficacy, goal orientation, and fear of failure as predictors of school engagement in high school students. *Psychology in the Schools, 40*(4), 417-427. 10.1002/pits.10092

Chen, L. H., Wu, C. H., Kee, Y. H., Lin, M. S., & Shui, S. H. (2009). Fear of failure, 2× 2 achievement goal and self-handicapping: An examination of the hierarchical model of achievement motivation in physical education. *Contemporary Educational Psychology, 34*(4), 298-305. https://doi.org/10.1016/j.cedpsych.2009.06.006

Conroy, D. E., Willow, J. P., & Metzler, J. N. (2002). Multidimensional fear of failure measurement: The performance failure appraisal inventory. *Journal of applied sport psychology, 14*(2), 76-90. 10.1080/10413200252907752

De Castella, K., Byrne, D., & Covington, M. (2013). Unmotivated or motivated to fail? A cross-cultural study of achievement motivation, fear of failure, and student disengagement. *Journal of educational psychology*, *105*(3), 861. 10.1037/a0032464

Diaconu-Gherasim, L. R., & Măirean, C. (2016). Perception of parenting styles and academic achievement: The mediating role of goal orientations. *Learning and Individual Differences*, *49*, 378-385. 10.1016/j.lindif.2016.06.026.

Dinger, F. C., Dickhäuser, O., Spinath, B., & Steinmayr, R. (2013). Antecedents and consequences of students' achievement goals: A mediation analysis. *Learning and Individual Differences, 28*, 90-101. https://doi.org/10.1016/j.lindif.2013.09.005

Dweck, C. S. (1986). Motivational processes affecting learning. *American psychologist*, *41*(10), 1040. 10.1037/0003-066X.41.10.1040

Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological review, 95*(2), 256. https://doi.org/10.1037/0033-295X.95.2.256

Elliot, A. J., & Church, M. A. (1997). A hierarchical model of approach and avoidance achievement motivation. *Journal of personality and social psychology, 72*(1), 218.

Elliot, A. J. (1999). Approach and avoidance motivation and achievement goals. *Educational psychologist, 34*(3), 169-189. https://doi.org/10.1207/s15326985ep3403_3

Elliot, A. J., and M. V. Covington. 2001. "Approach and Avoidance Motivation." *Educational Psychology Review 13* (2): 73–92.

Elliot, A. J., & McGregor, H. A. (2001). A 2× 2 achievement goal framework. *Journal of personality and social psychology, 80*(3), 501. 10.1037/0022-3514.80.3.501

Elliot, A. J., & Pekrun, R. (2007). Emotion in the hierarchical model of approach-avoidance achievement motivation. *In Emotion in education* (pp. 57-73). Academic Press. https://doi.org/10.1016/B978-012372545-5/50005-8

Elliot, A. J., and K. Murayama. 2008. "On the Measurement of Achievement Goals: Critique, Illustration, and Application." *Journal of Educational Psychology 100* (3): 613–28. 10.1037/0022-0663.100.3.613.

Giel, L. I., Noordzij, G., Noordegraaf-Eelens, L., & Denktaş, S. (2020). Fear of failure: a polynomial regression analysis of the joint impact of the perceived learning environment and personal achievement goal orientation. *Anxiety, Stress, & Coping*, *33*(2), 123-139. 10.1080/10615806.2019.1695603

Haghbin, M., McCaffrey, A., & Pychyl, T. A. (2012). The complexity of the relation between fear of failure and procrastination. *Journal of Rational-Emotive & Cognitive-Behavior Therapy, 30*(4), 249-263. 10.1007/s10942-012-0153-9

Keys, T. D., Conley, A. M., Duncan, G. J., & Domina, T. (2012). The role of goal orientations for adolescent mathematics achievement. *Contemporary educational psychology, 37*(1), 47-54. https://doi.org/10.1016/j.cedpsych.2011.09.002

Lin, Y., Chen, Y., & Zhang, Y. (2021). A Study of the Relationship between Achievement Goal Orientation on Online Academic Procrastination among Junior High School Students: Multiple mediation analysis of task

value and motivational regulation. In 2021 the 6th International Conference on Distance Education and Learning (pp. 218-226). 10.1145/3474995.3475032

Luo, W., Aye, K. M., Hogan, D., Kaur, B., & Chan, M. C. Y. (2013). Parenting behaviors and learning of Singapore students: The mediational role of achievement goals. *Motivation and Emotion, 37,* 274-285. https://doi.org/10.1007/s11031-012-9303-8

Maehr, M. L. (2001). Goal theory is not dead—Not yet, anyway: A reflection on the special issue. *Educational Psychology Review, 13,* 177-185. https://doi.org/10.1023/A:1009065404123

Martin, A. J., & Marsh, H. W. (2003). Fear of failure: Friend or foe?. *Australian Psychologist, 38*(1), 31-38. 10.1080/0005006031000170E6997

McClelland, D. C. (1985). How motives, skills, and values determine what people do. *American psychologist, 40*(7), 812. https://doi.org/10.1037/0003-066X.40.7.812

McGregor, H. A., & Elliot, A. J. (2005). The shame of failure: Examining the link between fear of failure and shame. *Personality and social psychology bulletin, 31*(2), 218-231. 10.1177/0146167204271420

Meyza, K. Z., P. M. Boguszewski, E. Nikolaev, and J. Zagrodzka. 2011. "Age Increases Anxiety and Reactivity of the Fear/ Anxiety Circuit in Lewis Rats." *Behavioural Brain Research 225* (1): 192–200. 10.1016/j.bbr.2011.07.011

Nair, P. N., & Sutar, M. D. (2023). Fear of Failure, Academic Self-Efficacy and Academic Performance

among College Students. *International Journal of Indian Psychology, 11*(3). 10.25215/1103.036

Puente-Díaz, R. (2013). Achievement goals and emotions. *The Journal of Psychology, 147*(3), 245-259. https://doi.org/10.1080/00223980.2012.683893

Sagar, S. S., and J. Stoeber. 2009. "Perfectionism, Fear of Failure, and Affective Responses to Success and Failure: The Central Role of Fear of Experiencing Shame and Embarrassment." *Journal of Sport & Exercise Psychology 31* (5): 602–27

Schayek, R., and M. Maroun. 2015. "Differences in Stress-Induced Changes in Extinction and Prefrontal Plasticity in Postweanling and Adult Animals." *Biological Psychiatry 78* (3): 159–66. 10.1016/j.biopsych.2014.10.004.

Seijts, G. H., Latham, G. P., Tasa, K., & Latham, B. W. (2004). Goal setting and goal orientation: An integration of two different yet related literatures. *Academy of management journal, 47*(2), 227-239. https://doi.org/10.5465/20159574

Solomon, L. J., & Rothblum, E. D. (1984). Academic procrastination: Frequency and cognitive-behavioral correlates. *Journal of counseling psychology, 31*(4), 503. 10.1037/0022-0167.31.4.503

Wolters, C. A. (2004). Advancing achievement goal theory: Using goal structures and goal orientations to predict students' motivation, cognition, and achievement. *Journal of educational psychology, 96*(2), 236. 10.1037/0022-0663.96.2.236

Pathways to Life Skills in High Schools and Universities-Teachers' Perceptions and Experiences

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Pathways to Life Skills in High Schools and Universities-Teachers' Perceptions and Experiences

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Abstract	
Keywords: life skills; life skills education; teachers' perceptions; critical thinking; qualitative research.	Education needs to reshape the individual's role in the societies of the future. In an unknown world of different technologies, job requirements, and societal structures, the current education systems may not be sufficient to equip young generations with the competences needed to succeed and thrive in the world they will inhabit as adults. In order to develop the skills needed for the future, learners should have access to an education that emphasizes both the importance of hard skills and life skills in a close relationship and interdependence. Built upon the impact of teachers' belief system on educational practice and using an inductive approach, our study aims to investigate perceptions and experiences of high-school teachers and professors from different faculties regarding life skills. Our foci were on the perceptions of life skills needed in education, barriers and effective practices related to life skills development and educators' life skills. Data was collected through semi-structured interviews with 7 professors from 3 universities and 13 teachers from 13 high-schools in Romania. The findings from the thematic analysis revealed three main themes emerging from participants' responses: "the conceptualization and impact of life skills", "educating life skills", "teachers' and professors' life-skills in action". Practical implications and recommendations are discussed.

Zusammenfasung	
Schlüsselworte: Lebenskompetenzen; Lebenskompetenz Erziehung; Lehrerwahrnehmung; kritisches Denken; qualitative Forschung.	Die Bildung muss die Rolle des Einzelnen in den Gesellschaften der Zukunft neu gestalten. In einer unbekannten Zukunft mit unterschiedlichen Technologien, beruflichen Anforderungen und noch nicht erfundenen gesellschaftlichen Strukturen reichen die derzeitigen Bildungssysteme möglicherweise nicht aus, um junge Generationen mit den Kompetenzen auszustatten, die sie benötigen, um in der Welt, in der sie als Erwachsene leben werden, erfolgreich zu sein und zu gedeihen. Um die für die Zukunft erforderlichen Fähigkeiten zu entwickeln, sollten die Lernenden Zugang zu einer Bildung haben, die sowohl die Bedeutung von Fachkenntnissen als auch von Lebenskompetenzen in enger Beziehung und gegenseitiger Abhängigkeit hervorhebt. Aufbauend auf den Auswirkungen des Glaubens systems von Lehrern auf die pädagogische Praxis und unter Verwendung eines induktiven Ansatzes zielt unsere Studie darauf ab, die Wahrnehmungen und Erfahrungen von Gymnasiallehrern und Professoren aus verschiedenen Fakultäten in Bezug auf Lebenskompetenzen zu untersuchen. Unsere Schwerpunkte lagen auf der Wahrnehmung von Lebenskompetenzen, die in der Bildung benötigt werden, auf Hindernissen und effektiven Praktiken im Zusammenhang mit der Entwicklung von Lebenskompetenzen sowie auf den Lebenskompetenzen von Lehrern. Die Daten wurden durch halbstrukturierte Interviews mit 7 Professoren von 3 Universitäten und 13 Lehrern von 13 Gymnasien in Rumänien erhoben. Die Ergebnisse der thematischen Analyse zeigten drei Hauptthemen, die aus den Antworten der Teilnehmer hervorgingen: "die Konzeptualisierung und die Auswirkungen von Lebenskompetenzen", "die Vermittlung von Lebenskompetenzen", "die Lebenskompetenzen von Lehrern und Professoren in Aktion". Es werden praktische Implikationen und Empfehlungen diskutiert.

1. Introduction

Education needs to reshape the individual's role in the societies of the future. There is already an important debate about the role of the educational systems in preparing the young generations for solving the unpredictable and complex challenges of the VUCA world. In an unknown future of different technologies, job requirements, and societal structures not yet invented, what is typically taught in most schools today may not be sufficient to equip today's children with what they need to succeed and thrive in the world they will inhabit as adults (NRC, 2012). In order to develop the skills needed for the future, learners should have access to an education that emphasizes both the importance of hard skills and life skills in a close relationship and interdependence.

2. Theoretical framework

The current educational frameworks widely adopted the integrated design of hard skills with soft and life skills (Mourshed et al. 2014). For example, the Partnership for 21st century skills (P21, 2009) designed a well-structured framework for describing

the skills for the future. Each skill is defined by specific key-competences. The three main categories of the skills are: (1) learning and innovation (2) life and career skills and (3) information, media and technology skills. Those sets of competencies are interrelated and require some specific core knowledge for each academic subject and domain. Under the umbrella of learning and innovation skills there are mainly the competencies of communication, collaboration, creativity, problem solving. Life and career skills refers to adaptability, flexibility, self-directedness and self-management, intercultural competence. Third, information, media and technology skills are defined as the main competencies used in the interaction with digital and technology tools and information.

Another important and applicable framework for improving individual and collective functioning comes from positive psychology, the character strengths framework (Peterson and Seligman 2004). The benefit of implementing the character strength framework in education is that it allows students to thrive and develops a service oriented approach that facilitates community involvement. Skills such as courage, motivation, creativity, empathy, are essential for our communities in the future. (Park & Peterson, 2009). Character strengths are a cluster of multidimensional positive traits that are essential for well-being and productivity which have cognitive, emotional, behavioral and social dimensions (Park and Peterson 2006a, 2009). In the positive psychology classification, the VIA classification is a taxonomy for the character's strengths and characteristics. Peterson and Seligman (2004) identified six essential attributes that are consistently highly studied and have roots in philosophy and religion. These include transcendence, humanity, justice, courage, wisdom, and temperance. They also discovered 24 character strengths, which are the mental processes or mechanisms that characterize these strengths and provide as examples of how they show as traits. The 24th strengths are: bravery, creativity, curiosity, appreciation of beauty and excellence, fairness, forgiveness, gratitude, honesty, hope, humility, humor, judgment, kindness, leadership, love, love of learning, perseverance, perspective, prudence, self-regulation, sense of meaning, social intelligence, teamwork, zest. (Peterson & Seligman 2004). Character strengths are essential for children's and adults' lifelong optimal development and flourishing (Harzer 2016; Park & Peterson 2006a). They have been demonstrated to manifest in a variety of situations and contexts and to

contribute to productivity and optimal functioning (Proyer et al. 2015). It has been proposed that developing, using, and practicing character strengths allows people to apply their potential (Peterson and Seligman 2004; Seligman 2012).

The third important framework related life skills that are relevant for the future, is the LifeComp model of European Commission (Sala et al., 2020), a tool for personal, social and learning key competences. It can be used to design educational activities and as a guideline for curriculum modifications. LifeComp framework encompasses a set of competences that will enable people to prosper in personal and professional areas. There are nine competences in LifeComp, each with three descriptors. The personal area encompasses self-regulation, flexibility, wellbeing. Those three competences are referring to the competencies of awareness, self-management and the management for uncertainty and challenges, but also to the sustainable lifestyle. The social area encompasses empathy, communication and collaboration. The social dimensions are related to the understanding of others and values of diversity and effective communication and teamwork. The learning to learn area is defined by growth mindset, critical thinking and managing learning. The competencies of the third area encompasses a flexible cognitive orientation toward learning and progress, but also the capacity to assess the information and to develop innovative solutions and to adopt an effective plan related to the learning process. (Sala et al., 2020). The main purpose of the LifeComp conceptual model is to support the educational practices and to offer a common understanding of key-competences at European level.

All the life skills frameworks we presented above are offering a broad perspective over the importance of promoting life skills for building sustainable educational systems and communities. Understanding those frameworks and the competences they promote may serve for fostering resilience and help students successfully navigate the world changes and challenges.

Life skills play a dual role, serving both preventive and promotional functions with immediate, short-term benefits, as well as more indirect, longer-term impacts. The overall influence of life skills is intertwined with socioemotional health and cognitive, social, and moral development (Brown et al., 1999). Life skills offer direct motivational advantages, contributing to positive short-term outcomes such as enhanced life satisfaction and even influencing academic

achievement (Waldron, 2009). Additionally, life skills are associated with increased self-esteem (Hajizadehanari et al., 2013) and a positive self-concept. According to Hajizadehanari et al. (2013), they play a crucial role in various aspects of individuals' psychological and social well-being. In the longer term, life skills are associated with healthy coping strategies in challenging contexts (Irannezhad, 2017).

Most of the life skills education takes place within classrooms and heavily relies on teachers. Nevertheless, research findings indicate that the national curricula play a significant role in influencing teachers' approach to informal life skills education (Anagün, 2018). The adoption of educational practices is primarily influenced by teachers' belief systems, constituting the most crucial factor (Levin & Nevo, 2009). The synergy between beliefs and behaviors is evident, with beliefs exerting a profound impact on teachers' classroom practices (Fullan, 2011).

3. Rationale and Aim of the Study

There is a research gap regarding the teachers and professors' perceptions about the relevance of specific life skills in schools and in their professional life. The need to understand how teachers and professors conceptualize life skills and how they perceive their role in the development of those skills for students is important in order to develop effective teacher training programs. Moreover, it is essential to explore the teachers and professors' perspectives about their own life skills and the need to develop them. Therefore, we aim to provide a better understanding of life skills through the perceptions of teachers and professors from different high-schools and universities in Romania. We adopted a qualitative approach to respond to our research questions.

The primary questions were:

(1) what kind of perceptions do teachers/professors have of the life-competencies needed to be developed as a teacher/professor in high-school/university?

(2) what are the main perceived barriers and effective practices related to the development of life-competencies in schools?

(3) which are the life-competencies teacher/professor must develop in order to increase the effectiveness of their professional success?

4. Method

2.1. Participants and procedure

A qualitative study was conducted through semi-structured interviews. The participants were 7 professors from 3 universities in Romania and 13 teachers from 13 high-schools in Romania, with different teaching experience and from all main domains (arts and humanities, social sciences, life science, technology). There were 6 males and 12 female participants. The interviews were conducted in 2023 by volunteers, other than the principal investigators, online or on-site, depending on the participant availability. Interviews were transcribed and coded.

2.2. Data analysis

We adopted a social constructivist framework, emphasizing the subjective nature of reality and the significance of individuals' experiences and perceptions (Hays & Singh, 2012). From a social-constructivist approach the researcher's objective is to "make sense of (or interpret) the meaning others have about the world" (Creswell, 2013, p. 25). Therefore, we explored how participants understand and construct knowledge regarding life skills development in schools and universities based on their experiences (Creswell, 2013). We analyzed the responses using the thematic analysis process developed by Braun and Clarke (2006). We read the transcripts and connected it to the research questions to reduce them to meaning units and to organize the meaning units in codes. After the initial coding process, we organized the codes into 22 categories. In the last step, we organized the data into three main themes with several sub-themes.

5. Results

Three primary themes were derived from the participant responses, as follows: (1) The conceptualisation and impact of life skills, (2) Educating life skills, (3) Teachers 'and professors ' life-skills in action. In the section below, we list each of these themes, along with the sub-themes we found for each theme and some quotes from the interviews.

3.1. The conceptualisation and impact of life skills

The first powerful theme that emerged from the participants' responses is related to the personal understanding of life skills in the context of education and the perception regarding the main competencies schools and universities need to pay attention to in order to facilitate students' future personal and professional success. The sub-themes we extracted

are: life skills as adaptability and well-being skills, the need of various life-skills, the power of critical thinking

Firstly, life skills, seen mainly as a mean of *adaptation and well-being*, is expressed concisely and directly by these responses:

"Life skills are the skills that people need in order to live a full life, to develop personally, socially, professionally and to live with others". (Teacher 3)

"I believe that these competences refer to a person's ability to adapt to the various circumstances they face in order to cope with life's various challenges and to know how to handle a wide variety of situations". (Professor 7)

"Life skills refer to those personal skills…characteristics…ways of thinking that help good social integration, good resource management, and beneficial emotional activation". (Teacher 5)

Second, *the need for various life-skils/competencies* was mentioned by all of the participants. They explicitly mentioned the importance of many life-skills:

"In my opinion, there is a need of many life skills as critical thinking, creativity, the ability to relate and work in a team, the ability to organize your time and focus your effort towards a specific goal, the ability to persevere despite failures, the ability to communicate and listen to the opinions of others (related to these are empathy, kindness, understanding), the capacity for self-criticism and self-evaluation, so necessary for personal development, and much more." (Professor 2)

"I believe that the most useful and necessary life skills that school should develop are critical and creative thinking skills, communication skills and collaboration and teamwork skills." (Teacher 12)

"There are various life skills that can be developed and incorporated into university curricula, but some of the most important and essential, in my opinion, are the following: critical thinking and problem solving, effective communication, time management, financial literacy and negotiation, media literacy, emotional intelligence, resilience and flexibility". (Professor 1)

Third, *the power of critical thinking* as a sub-theme was extracted from the large majority of the responses. All the participants selected critical thinking as a top skill which is relevant for enhancing students' potential.

"Critical thinking and problem solving are, in my opinion, essential life skills that allow people to examine information, evaluate claims and come up with original solutions to challenging problems. Achievements in a variety of spheres of life, including academic, interpersonal and professional outcomes, depend on these skills." (Professor 1)

"Critical thinking is an indispensable skill in the personal development of young people….Young people will be able to better understand the problems they face, find the best solutions and form relevant opinions based on reason." (Teacher 9)

"Critical thinking is a vital skill for any human being, because it helps him to understand himself, those around him, the way the world is constructed, the ways in which life can be lived, the activities that make life more enjoyable and give it meaning etc". (Teacher 12)

"If I were to pick one skill, it would be the ability to think critically. This skill is essential in any field and helps the young person to make informed decisions, understand and evaluate arguments and approach problems in a creative way". (Professor 7)

3.2. Educating life skills

The second theme revealed the perceived valence of the educational experiences related to life skills development in schools, focusing on the negative and positive aspects of engaging in the development of life skills in schools and universities. Responses reveal two subthemes: perceived barriers, effective educational practices.

First, the perceived barriers in the development of life skills in high-school and universities are reflected in the following responses:

"The main barriers to developing these skills in students include lack of motivation, lack of confidence in their own abilities, fear of taking risks and being judged, and learning or mental health problems." (Teacher 12)

"I think there are some important issues in the development of life skills. One of them is the absence of a coherent educational system that explicitly and systematically includes these skills. Instead of being treated as an integral aspect of the learning process, these skills are often seen as an afterthought or a "bonus" added at the end. They are also not always easy to assess and are not always taken into account in standardized examinations." (Professor 4)

"Learning is group-based, not personalized. In order to ensure that as many students as possible have access to education and because there is a shortage of teachers, there are many students in a classroom, which does not allow teaching to be done in an individualized, personalized way. As far as university education is concerned, universities, in order to ensure their survival, are geared towards attracting as many students as possible." (Teacher 5)

Second sub-theme revealed some common effective educational practices related to life skills development:

"...active learning techniques such as discussion and role-playing, experiential learning through internships, cooperative and cooperative learning programs through the workplace and its continuous development, collaborative learning through group projects…and self-assessment techniques." (Professor 2)

"...creating a positive learning environment, encouraging students/students to express their ideas and opinions, providing constructive feedback and creating personalized learning opportunities tailored to individual needs can develop life skills…" (Thacher 3)

"Life skills can be developed through various activities such as: debate and reflection sessions on different topics (understanding the internal and external political context, religious or ethnic tolerance, etc.), teamwork, critical analysis of written articles, role play, simulation (courtroom)." (Professor 6)

3.3. Teachers and professors life skills in action

The third theme which emerged from the responses is related to the importance of teachers 'own life skills and personal development for helping build students' life skills. The main sub-themes refer to: interpersonal skills and intrapersonal skills.

Firstly, the interpersonal skills sub-theme revealed the importance of communication, empathy people management for professors and teachers:

"A good professor must be empathetic, precisely in order to set an example of caring for others." (Teacher 8)

"I believe that the most important skills for a teacher are those related to people management/leadership and non-violent communication. I believe that they allow the pedagogical activity to be managed in an efficient and

pleasant way (for both teachers and students)." (Teacher 3)

"Empathy- We need to realize that students are human and come with a certain emotional baggage and we need to know how to handle the situation in a way that makes the student feel understood, included." (Professor 1)

Second, the intrapersonal skills sub-theme revealed the importance of an open, flexible and creative mindset and emotional competence for professors and teachers:

"Any teacher, regardless of the subject taught, should first and foremost be emotionally mature, therefore coherent with oneself, a socially desirable person and capable of educational interaction with children and young people." (Teacher 11)

"In terms of teachers' skills, I believe that - just as with students - teachers should have this ability to look at things from multiple perspectives and this degree of mental flexibility and continuous curiosity." (Professor 6)

"Professors need to adopt a growth mindset regarding their own potential of learning to be better facilitators of learning. " (Professor 2).

6. Discussions

The results of our study revealed valuable findings about the teachers' and professors' perceptions related to the development of life skills in schools and universities in Romania. The research contributes to a more deeply understanding of the topic in order to build more effective teacher training programs and educational strategies. Analyzing the themes and subthemes which emerged from the responses, we can see a close connection between the responses of the teachers and professors, revealing a common understanding of the topic, but also similar experiences and perceptions about the students' and their own life skills. There was a shared understanding among teachers and professors regarding life skills, emphasizing adaptability, critical thinking, and diverse skill sets.

The first theme revealed participants' perceptions of life skills in the educational context, with a focus on competencies deemed vital for students' future personal and professional success. The participants' articulations reflect a collective recognition of the interconnectedness of life skills and their integral role in personal and professional success. Participants expressed their consideration of students' individual

needs for developing life skills and the importance of building upon individual needs to build various competencies. This is consistent with various models of life skills development showing the relevance of multiple skills building (Cronin et al., 2020; Cronin et al., 2023). The consensus on the significance of critical thinking underscores its perceived importance in enhancing students' potential across various aspects of life. Our participants' evaluation of the importance of life skills and the perceived value of critical thinking is in line with previous studies: critical thinking is regarded as the most elevated intellectual activity in human interaction, empowering individuals to participate in the meaningful decision-making process (Rönnlund et al., 2019).

The second theme, "educating life skills", underscored the dual nature of the educational experiences related to life skills development, presenting both perceived barriers and effective educational practices. The challenges outlined indicate areas for improvement in educational systems, while the effective practices provide insights into positive approaches to fostering life skills in students. The barriers and educational good practices identified are in line with previous research results showing that active and collaborative teaching strategies, community-based projects, debates etc. provide opportunities to discover and develop life skills (Waldron, 2009). Both teachers in high schools and in universities see opportunities and the need to infuse life skills education into daily activities, which is in line with Brand & Moore (2011) research.

The third theme highlights that teachers' life skills, particularly in interpersonal and intrapersonal skills, play a crucial role in shaping students' life skills. The emphasis on empathy, effective communication, emotional competence, and a growth mindset underscores the holistic approach required for quality teaching and learning experiences. Teachers and professors play a pivotal role in enhancing the educational quality, refining school environments, and effectively implementing curricula. Consequently, life skills are essential for educators involved in the education and character development of students (Koksal, 2013). Moreover, it is important to mention that the training of life skills may significantly improve didactic outcomes (Gazda et al., 2001).

7. Conclusions

These findings provide important insights into the educators' perspectives about building life skills in high-school and university students in Romania, offering a foundation for curriculum development and educational strategies that foster a comprehensive set of life skills. Many research has suggested that teachers' belief system and mindset influence pedagogical approaches, students' efficacy and performance. (Cronin et al., 2023).

With the aim to investigate the perceptions of teachers and professors from different high-schools and universities in Romania on the life skills needed for students' successful development, our study enriches the understanding of the specificity of Romanian educators' perspective over the topic. There are also some limitations we assume, related to the small number of the participants, the voluntary participation, and their selection from the NW part of the country. Future research should address a more diverse and larger sample of teachers and professors.

The paper provided several findings that can inform teacher training strategies and curriculum approaches by providing an analysis of the perspective on the life competences of the teachers and professors with various academic backgrounds and career levels.

The finding may also provide the foundation for the development of practical recommendations for academics and high-school teachers to develop students' life skills.

Incorporating open and diverse mindsets and strategies into the educational settings will contribute to building an effective vision that can equip students with the tools they need to thrive and be successful.

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References

Anagün, Ş.S. (2018). Teachers 'Perceptions about the Relationship between 21st Century Skills and Managing Constructivist Learning Environments. *International Journal of Instruction*. 1. 825-840. 10.12973/iji.2018.11452a.

Brand, B. R., & Moore, S. J. (2011). Enhancing teachers ' application of inquiry-based strategies using a

constructivist sociocultural professional development model. *International Journal of Science Education*, *33*(7), 889-913.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Brown, L.M., Way, N. and Duff, J.L. (1999) 'The Others in My I: Adolescent girls 'Friendships and Peer Relations', in N.G. Johnson, M.C. Roberts and J. Worell (eds) *Beyond Appearance: A New Look at Adolescent Girls*, pp. 205–225. Washington, DC: American Psychological Association .

Creswell, J.W. (2013). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. 4th Edition, SAGE Publications, Inc., London.

Cronin, L., D. Marchant, L. Johnson, E. Huntley, M. C. Kosteli, J. Varga, and P. Ellison. 2020. "Life Skills Development in Physical Education: A Self-Determination Theory-Based Investigation Across the School Term." *Psychology of Sport and Exercise* 49: 101711. https://doi.org/10.1016/j.psychsport.2020.101711.

Fullan, M (2011) *The Moral Imperative Realized*, Corwin Press, Thousand Oaks, CA; Ontario Principals Council, Toronto.

Gazda, G. M., Ginter, E. J., & Horne, A. M. (2001). *Group counseling and group psychotherapy: Theory and application.* Boston, MA: Allyn and Bacon.

Hajizadehanari, K., Fard, S. M. H. S. H., Hajizadehanari, H., Yaghoubzadeh, A., Farhadian, A. & Askari, M. (2013). The Effectiveness of Life Skills Education With Religious Approach to Safety, Mental Health and Self-Esteem in Elementary School Students. *The European Journal of Social & Behavioural Sciences*, 5(2), 245-255.https://doi.org/10.15405/ejsbs.67

Harzer, C. (2016). The eudaimonics of human strengths: The relations between character strengths and well-being. In J. Vittersø (Ed.), *Handbook of eudaimonic well-being* (pp. 307–322). Springer International Publishing/Springer Nature. https://doi.org/10.1007/978-3-319-42445-3_20

Irannezhad, S. (2017). Effectiveness of life-skills training on the mental health of 2nd grade female High School students in Bam-Iran. *Bali Medical Journal*, *6*(3), 583-588.

Köksal, M. S. A comprehensive research design for experimental studies in science education. *İlköğretim Online*, 2013. 12(3).

Levin T & Nevo Y (2009) Exploring teachers 'views on learning and teaching in the context of a trans-disciplinary curriculum, *Journal of Curriculum Studies*, 41:4, 439-465, DOI: 10.1080/00220270802210453.

LifeComp: The European Framework for Personal, Social and Learning to Learn Key Competence (EUR 30246

EN). Luxembourg: Publications Office of the European Union. https://dx.doi.org/10.2760/302967

Lorcan Cronin, Rebecca Greenfield & Anthony Maher (2023). A Qualitative Investigation of Teachers ' Experiences of Life Skills Development in *Physical Education, Qualitative Research in Sport, Exercise and Health*, 15:6, 789-804, DOI: 10.1080/2159676X.2023.2222774

Maria Rönnlund, Kristina Ledman, Mattias Nylund & Per-Åke Rosvall (2019) Life skills for 'real life': How critical thinking is contextualised across vocational programmes, *Educational Research*, 61:3, 302-318, DOI: 10.1080/00131881.2019.1633942

Mourshed, M., Patel, J., & Suder, K. (2014). *Education to employment: Getting Europe's youth into work. McKinsey Center for Government*. Washington DC. Retrieved fromhttp://www.mckinsey.com/insights/social_sector/converting_education_to_employment_i n_europe

National Research Council. 2012. *Education for Life and Work: Developing Transferable Knowledge and Skills in the 21st Century*. Washington, DC: The National Academies Press. https://doi.org/10.17226/13398.

Park, N., & Peterson, C. (2006a). Character strengths and happiness among young children: Content analysis of parental descriptions. *Journal of Happiness Studies, 7*, 323–341.

Park, N., & Peterson, C. (2009). Strengths of character in schools. In R. Gilman, E. S. Huebner, & M. J. Furlong (Eds.), *Handbook of positive psychology in schools* (pp. 65–76). Routledge/Taylor & Francis Group.

Peterson, C., & Seligman, M. E. P. (2004). *Character strengths and virtues: A handbook and classification.* Oxford University Press; American Psychological Association.

Proyer RT, Gander F, Wellenzohn S and Ruch W (2015) Strengths-based positive psychology interventions: a randomized placebo-controlled online trial on long-term effects for a signature strengths- vs. a lesser strengths-intervention. *Front. Psychol.* 6:456. doi: 10.3389/fpsyg.2015.00456

Sala, A., Punie, Y., Garkov, V., & Cabrera Giraldez, M. (2020*). LifeComp: The European Framework for Personal, Social and Learning to Learn Key Competence*. JRC Publications Repository: European Commision.

Waldron, J. J. (2009). Development of life skills and involvement in the girls on Track program.(Original Research Article)(Report*). Women in Sport & Physical Activity Journal, 18(2)*, p. 60.

*** P21 (2009). P21 Framework Definitions. Partnership for 21st Century Skills (P21).