Research Article

Online homework assignments: A case study for 5ᵗʰ grade of primary school in Greece

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ARTICLE INFO	ABSTRACT
	There is a growing body of scientific literature and research data recognizing the value of using online homework. Online homework may transform the way students learn outside the classroom, offering a dynamic and interactive approach to reinforcing learning objectives. This paper explores the concerns of educators arising from the integration of the online homework assignment and presents an educational intervention for 5ᵗʰ grade students. The aim of the intervention was to engage students in online homework as a supplementary material to the educational process. Results from the evaluation of the intervention are presented and the benefits of the intervention are highlighted. Although there are various technological, pedagogical and social challenges that need to be addressed, online homework can contribute to a more positive learning environment. Teachers who assign online homework seem to help enhance students' intrinsic learning motivation so that students may achieve better learning outcomes. **Keywords:** online homework, learning motivation, primary school

INTRODUCTION

Homework has been an area of research for the educational community and the researchers who specialize in the field of education and educational psychology. Research evidence considers homework as a tool to improve students' study skills and learning, but the extent to which homework assigned to students is related to students' academic performance depends on the characteristics of the homework (Magalhães et al., 2020; Núñez et al., 2015). According to research, the time that students spend on completing homework is not a positive predictor of the correlation between homework and educational outcomes (Núñez et al., 2015; Valle et al., 2016). Doing homework regularly is positively associated with students' academic performance (Zimmerman & Kitsantas, 2005) but on a daily basis, assigning a large amount of homework, which takes a long time to complete, increases inequality between students and does not bring significant educational benefits (Fernández-Alonso et al., 2017). Daily homework should be assigned in a rational framework and teachers have to emphasize to quality rather than quantity. Giving a reasonable amount of homework, students are more likely to be actively involved in the process and could manage their study time more effectively, improving their academic achievement (Cooper et al., 2006; Núñez et al., 2015; Xu & Yuan, 2003). At this point, we should mention the students' motivation, which is another significant factor that is important for the achievement of homework objectives. Evidence shows that intrinsically motivated students tend to be more engaged in homework in order to deepen their knowledge, they devote more effort to their work in order to achieve better results and this is associated with positive educational outcomes (Howard et al., 2021; Suárez el al., 2019; Valle et al., 2016). If the students' attitudes toward homework is motivated by external factors (extrinsic motivation), such as rewards of their parents or fear of upsetting their teacher, the students consider the completion of the homework as an obligation (Suárez el al., 2019; Valle et al., 2016) and in this way the benefits of homework are minimized.

To enhance students learning motivation, it is recommended that educators involve students in the selection of learning projects that align with their individual interests, given the recognized importance students place on the value of such projects (Vassiloudis & Chalda, 2024; Wigfield & Eccles, 2000). The science education community's recent focus on digital media aligns with students' affinity for technology as new generations of students become familiar with computers and digital tools (Magalhães et al., 2020). By strategically incorporating engaging and interactive digital tools, we can transform learning into a fun and motivating experience, fostering increased students' enthusiasm and engagement (Vassiloudis & Chalda, 2024). The integration of new technologies in educational practice is inevitably a necessity, aiming at increasing the interest of both students and teachers, improving the teaching and learning process (Mirzajani et al., 2016). Teachers, who are the driving force behind the effective

adoption of new technologies, are encouraged to integrate them into their teaching practices as they have the potential to bring about radical changes in the education process (Aczel et al., 2008).

The post-2019 situation has contributed to the increase in technological educational tools. In the early 2020s, humanity had to face an unprecedented challenge because of COVID-19. The global health crisis inevitably affected the way in which educational institutions at all levels in many countries operated. As a result, face-to-face learning had to be suspended, and teaching process had to be converted to distance learning. Distance education, which includes both distance teaching and distance learning, refers to education delivered through educational materials, with the instructor and the learner being at a distance in space and/or time (Moore, 1997). The term emergency remote teaching was used to define the new educational reality with which the global educational community was confronted (Ferri et al., 2020). With no formal training, teachers got creative to address this challenge. The educational and teaching approach was modified, with learning being conducted remotely with the aim of achieving the best and most meaningful communication between teacher and learners (Greenhow et al., 2022). Teachers developed online educational material and digital courses (Goudeau et al., 2021) aiming to mobilize students' interest and enhance their motivation. An important aspect of digital courses is online homework, which replaces or complements traditional homework (Bonham et al., 2001). These assignments can be developed by any educational software or application that allows the student to access assignments, receiving the necessary feedback from the teacher when completed and submitted online by the student (Lunsford & Pendergrass, 2016; Penner et al., 2015). The use of technology is perceived as a useful tool in the hands of the educational community, which of course cannot in itself lead to the progress of students (Dillard-Eggers et al., 2008). The integration of interactive teaching methods in the learning process can potentially improve students' learning retention, positively influencing their learning outcomes (Tarigan et al., 2023). For this reason, great attention must be paid by each teacher to the pedagogical approach, as technology in not a passive addition to the school routine but has the potential to modify the learning approaches and the classroom environment (Bonham et al., 2001).

Considering the above, the purpose of this paper is to present a case study that focuses on the implementation of online homework for 5th grade primary school students and the results obtained from the educational intervention. The paper is organized, as follows. First, the results recorded from qualitative empirical research on teachers' views on online homework in primary schools that preceded the intervention, results on which the intervention was based, are presented in summary. Then the design, implementation and results of the intervention are presented, and finally, through the results obtained, an attempt is made to evaluate the intervention.

TEACHERS' VIEWS ON ONLINE HOMEWORK ASSIGNMENTS IN PRIMARY SCHOOLS

Methodology

The educational intervention presented in paper is based on the theoretical background and the conclusions that emerged from postgraduate research, which was carried out in the framework of the postgraduate course "School counselling and guidance" of the department of pedagogy and primary education of the National and Kapodistrian University of Athens (Chalda, 2022).

The research questions were related to teachers' knowledge regarding online homework and their perceptions on the adoption of these assignments in educational practice. A qualitative methodological design was chosen, specifically the semi-structured interview method, in an attempt to investigate the personal views, perceptions and experiences of the participants (Snape & Spencer, 2003). The research sample of this study consisted of 14 teachers of primary education in the prefecture of Attica, Greece (13 female and 1 male). The interviews were conducted via telephone and via videoconference from February to May 2022.

Results

The majority of participants could not provide a clear and precise definition of online homework. Although they seem to identify the relationship that exists with new technologies, they could not precisely identify the context in which they can be used.

Regarding the positive elements they may have derived from them, respondents refer to digital skills acquired or enhanced, but also to the new teaching methods adopted. At the same time, the involvement of pupils in new activities, the enhancement of their motivation, their active participation in the learning process and more meaningful communication between pupils and teachers are also recorded as positive outcomes.

In trying to identify the negative outcomes that teachers attribute to online homework, feelings of insecurity and uncertainty seem to dominate. Respondents experienced intense stress in trying to deal with tasks that were unfamiliar and had not been assigned to them before. This inexperience created an additional concern about whether and to what extent the tasks assigned are appropriate for students and whether they can attract their interest by prompting them to engage meaningfully with them. As the skills and knowledge required to design these assignments were not available, long preparation and a lot of personal time for teachers' engagement was required. This led to both teachers and students spending long hours in front of the computer screen.

Although many teachers are willing to continue to assign digital assignments in addition to traditional assignments, even after the end of the pandemic health protocols and the return of students to the classroom, all express their worry about the prospect of exclusive online homework. In particular, they argue that the educational community itself is not yet ready to deal effectively with such a challenge. Despite their familiarity with new technologies, the absence of the knowledge and technological background to create and assign such tasks acts as a deterrent for them, as it is perceived as a threat to their professional career and development. Finally, particular attention is paid to the additional time teachers need to devote to creating and assigning

digital assignments. At the same time, there are strong concerns about whether there will be uninterrupted access to the learning process for all students. Inadequate material and technical equipment and the absence of a reliable network have prevented all children from engaging in online tasks, leading to their exclusion and reinforcing social inequalities. Two other factors that discouraged the participating teachers were the gradual move away from handwriting by students and the additional time needed to spend on the computer to complete the assignments. This, combined with the worries expressed about the appropriateness and effectiveness of these tasks, reinforces their opposition to a possible exclusive implementation.

DESCRIPTION AND RESULTS OF THE EDUCATIONAL INTERVENTION

Based on the above results, an educational intervention was designed and implemented during the school year 2022-23. The purpose of the intervention was the 5th grade students at our primary school (N = 23) to get involved, in addition to traditional homework, in online homework, as supplementary material in the educational process. An additional objective was for the intervention to be a training case study in order to overcome the hesitations or negative attitudes of the other schoolteachers with regard to the use of educational technology and online homework. As it was an educational intervention within the school curriculum, no ethical approval was required. The school council, consisting of the school principal and the schoolteachers as well as the parents of the students were informed about the objectives of the educational intervention.

The two research questions posed at the beginning of the educational intervention were the following:

RQ1. Can online homework increase students' interest and motivation to learn in the subject areas in which they are offered and support their learning?

RQ2. Can online homework encourage the active participation of all pupils, even those with learning difficulties, in the context of differentiated teaching at the level of learning readiness?

The 5th grade was chosen for two reasons. It was safe to assume that because of the age group, the students would have basic digital literacy skills and would be able to engage in and complete the digital tasks on their own. Also, if the results obtained from the work plan were satisfactory, this educational strategy could be repeated in the 6th grade.

The courses that were supported with interactive online homework assignments, interactive games and multimedia material were language, history and geography. The subjects of physics and mathematics were also supported in selected sections. The assignments were given detailed instructions on how to be completed by students, in order to ensure that the process was fully understandable. Students were also given immediate detailed feedback on each answer they gave, whether correct or incorrect, along with their final score.

The assignments had multiple difficulty levels, so that all the children in the class could work on them. They were designed to suit different learning styles and abilities, allowing students to progress at their own pace, while providing immediate feedback, without the mediation of the teacher of the class, to monitor their understanding and progress. Unlike traditional paper and pencil assignments, online homework included a wide range of activities, from interactive quizzes and virtual experiments to multimedia presentations and collaborative projects. These assignments leverage the power of technology to provide personalized learning experiences tailored to students' individual needs and preferences. It should be noted that gradually and based on the results obtained from the evaluative observations of the class teacher, the digital material was enriched with new assignments. All the material was posted on the e-class platform of the Greek school network (GSN). The classroom teacher developed a website from which students could access the assignments from active links.

The applications for writing interactive tasks and multimedia material used to create the tasks were the following: Hot potatoes, ActivePresenter, iSpring, eXeLearning, e-class and e-me tools of GSN. Different tools were chosen for the writing of the assignments, on the one hand to enrich the supporting material by the different potentials that the different tools offer in the writing of educational material and on the other hand to bring the students in contact with different digital environments. At this point, it should be mentioned that the limitation set in the choice of tools was that online homework should be able to be exported as html files and imported into the GSN e-class and not be activities hosted on pages of other web applications. This was considered appropriate in order to allow students to work on digital assignments in a safe environment and to avoid pop-ups of online advertisements.

In relation to the implementation of the educational intervention, the online homework assignments were initially used in daily educational practice to determine the level of students' learning readiness and as a tool to evaluate the acquisition of new knowledge. Through this process, the children were introduced to different digital environments and became practically familiar with them. Then, the online tasks and the study of the online material were assigned as optional homework, through which the new knowledge could be consolidated with direct feedback. Online homework was always accessible to students. They could repeat the assignments as many times as they wished as a review of the lessons they were taught as part of an overall assessment. The optional nature of the assignments was considered appropriate as there was no access from home to the online applications by all the students and to reinforce the feeling that the children themselves were responsible for the learning process.

The evaluation of the results of this educational intervention was done through teacher's unstructured systematic real-time silent observation of the students' attitudes and behaviors in relation to online homework, considering their results at the cognitive level in the modules of the courses where the specific homework was offered. Therefore, special attention was paid to increasing motivation to engage in the educational process through the use of online homework and the achievement of cognitive goals.

Based on the results of the evaluation, the objectives of the intervention have been satisfactorily achieved. The majority of students were actively engaged in online homework, and they had the opportunity to be exposed to a variety of learning tasks, to develop skills and to build knowledge. A gradual increase in enthusiasm and interest and a decrease in anxiety of most of the students regarding digital homework was observed. This fact was also noted by the parents of the students and was recorded as positive feedback. In addition, same students claimed that it was "*easier*" and "*funnier*" through frequent repetition of online homework *to "learn their lessons"*. A further positive element that was recorded as a result of the increase in learning motivation was the improvement in cognitive performance for some students, which was reflected in their assessments. Students with low performance in these subjects seemed to have been helped by the educational intervention. Real-time feedback and progress tracking features allowed students to monitor their performance and address areas of weakness more effectively.

In relation to the second research question that was posed at the beginning of the intervention, it was also observed that students with learning difficulties were supported in their learning and participated to a greater extent, especially when online homework was integrated into their daily educational process. Online homework seemed be a valuable tool for students with learning difficulties, but it's important to underline the educational frame in which the assignments have been used. Personalized and differentiated learning, immediate feedback, variety, interactive elements, clear instructions, explanations, and the repetitiveness of the exercises were the main characteristics of online homework for students and particularly for students with learning difficulties.

Finally, what is worth pointing out, which emerged during the educational intervention without having been planned in prior, is that the students who for various reasons (such as poor Internet connectivity, computer failure, lack of time or lack of motivation) were not engaged in online homework, expressed interest in completing these tasks during the school breaktimes. Gradually, and with the increasing participation of students in this type of activities, the students themselves also completed the tasks in groups in a context of self-organization and flexible grouping, with children who had consolidated the new knowledge supporting those who had not yet reached the consolidation stage.

DISCUSSION

In today's digital age, education is continually evolving to incorporate technology into the learning process. One significant aspect of this evolution is the use of online homework for primary school students. Online homework offers a dynamic platform that extends learning beyond the traditional classroom setting, providing students with interactive and engaging opportunities to reinforce and expand upon the concepts taught in class. Educational community is constantly looking for new ways to motivate students to become more actively involved in the learning process in order to promote optimal learning and achievement (Gillet et al., 2012; Lemos & Veríssimo, 2013; Taylor et al., 2014; Vassiloudis & Chalda, 2024). The advantages of e-learning relate to the development of student autonomy, self-regulated, self-directed and needs-oriented learning (Sun et al., 2008). The evaluation and feedback provided directly by digital homework is an important motivation for students to engage with it in a meaningful way since effective teacher-students interactions are essential in online learning practice (Middleton & Spanias, 1999; Zheng et al., 2022). At the same time, through the helpful comments and the possibility of multiple attempts, students can provide the correct answer and understand their mistakes (Davis & McDonald, 2016). Students' self-esteem and the perception that they are capable and worthy of achieving success are enhanced, making even greater, systematic, and organized effort to reach their goal (Halcrow & Dunnigan, 2012). Particular attention is also given to students with low learning motivation. Students with high intrinsic motivation will have equally positive results both for online assignments and traditional pen and pencil homework, but low intrinsic motivated students may benefit from online homework (Wooten & Dillard-Eggers, 2013). Although the scientific research data on the benefits of online homework in comparison to traditional work is scattered (Magalhães et al., 2020), online homework offers students the opportunity to engage with something new, original and different that is likely to motivate their interest and engage them more actively in the learning process. As a result, their learning performance may improve, and their self-image may be enhanced. The same seems to be the case for students who have low performance or learning difficulties (Halcrow & Dunnigan, 2012; Middleton & Spanias, 1999). These children may be overcome by feelings of inferiority, insecurity and resignation due to possible past failures, since self-esteem is the way in which persons completely evaluates themselves (Myers et al., 2011). This fact, having created the false impression that they are not worthy and capable of succeeding, reinforces their reluctance towards the learning process due to the fear of another failure and disappointment. Online homework can provide feedback to the learner, boosting their self-esteem and increasing their self-belief. Students appear to value positively teachers who recognize and support the effort made by them (Halcrow & Dunnigan, 2012). When all students' tasks are given as much direct and systematic feedback as possible, students are more interested in it and attribute more value to it. Despite teachers assigning homework to students on an almost daily basis, many homework assignments are not assessed and are never returned to students, or it may be a long time before they are returned. In both cases, students' systematic engagement with them is discouraged, with the value of feedback being weakened. Students learn best from homework when they are engaged and interested in it, they are motivated to invest effort in completing them, experiencing a sense of accomplishment rather than frustration and negative feelings (Trautwein et al., 2009). What is critical, but also difficult to attain, is the need for students to use technology to build knowledge to satisfy a personal desire for knowledge and not simply to satisfy course requirements (Penner et al., 2015), their teachers or their parents.

What seems to emerge from this case study is that students developed positive attitudes towards online homework, and they were supported and empowered in the learning process. Gradually the anxiety that can occur in relation to homework was reduced, while enthusiasm and engagement with online activities increased. The same observations were noted for pupils with learning difficulties. They gradually engaged with greater autonomy in online tasks, improving the scores on their assignments. It was also found that at the end of this educational intervention the other teachers in the school were more receptive to using this

type of homework for their students, overcoming their initial concerns, considering the satisfactory results for our students. Finally, it seemed to be a positive relationship between online homework and increased student participation in them, not only during the school educational process but also during school breaktimes, so that the classroom environment would function as a learning community and students would be encouraged in collaborative strategies. This observation does not fall within the context of homework, however it is worth highlighting as it could be used to support students who, for various reasons, could not engage in their homework. In our opinion, the careful planning of the work, the differentiation of tasks, the clear and detailed instructions, the direct and systematic feedback to the students were the key points of the educational intervention that led to the positive learning outcomes.

CONCLUSIONS

The purpose of this paper was to describe a case study on online homework for 5th grade of primary school and the results obtained from the educational intervention. The strong limitation of the present study is that it is only an exploratory effort since it does not meet the criteria of a structured research study. There was no experimental group or a control group to compare the results with each other using a strictly defined research protocol. However, the results obtained seem to agree with research data. Students' positive attitudes towards online homework, reduced stress to complete the tasks, high or moderate enthusiasm for participating in online classes and positive learning outcomes are some of the relevant research evidence (Albelbisi et al., 2024; Altun, 2008; Cui et al., 2021; Murphy et al., 2020). The proper integration of online homework into educational practice, careful planning and well-defined objectives and proper guidance and encouragement of students are essential for achieving positive learning outcomes. Additionally, educators have to play a crucial role in guiding students and parents in navigating these digital platforms effectively.

In conclusion, online homework, when used as a complement to traditional homework, may broaden and enrich children's cognitive and learning experiences and provide a powerful educational tool to motivate students in the learning process. While the integration of online homework into primary education offers advantages, there are also challenges that educators must navigate. There are various technological, pedagogical and social challenges that need to be addressed (Ferri et al., 2020) in order to ensure the success of distance learning and teaching and not reinforce social inequalities between students. Issues such as digital equity, ensuring access to technology and reliable internet connectivity for all students, and promoting responsible screen time usage are among the considerations that must be addressed. Further research, involving more students, is needed to provide a more comprehensive and reliable understanding.

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