Maltese Teachers' Perception of the Use of Digital Resources in the 21st Century Classroom

Tracey Ann Vella Cumbo

Abstract

This study looks into the use of digital resources amongst state primary teachers teaching the Junior Years (students aged between 7 and 11). It evaluates whether teachers are making use of digital resources, the extent to which they are doing so, and how this is affecting the acquisition of digital literacy skills. The research methodology applied focused on a mixed methods approach. Data were collected from a total of 75 participants, incorporating surveys (n=64) with semi-structured interviews with state primary teachers (n=7) and representatives from the Directorate for Digital Literacy and Transversal Skills (n=4). The results obtained demonstrate that teachers are making use of digital resources. However, they also illustrate that teachers are mainly using them as a substitute for hands-on resources and rarely encourage students to create new digital material. Consequently, students are not being fully equipped with the 21st-century skills needed to become digital citizens.

Keywords

Digital Literacy, Digital Resources, Maltese Education, Primary Teachers, 21st-Century Skills

Introduction

In 2014, the Ministry for Education and Employment (MEDE), now known as the Ministry for Education, Sport, Youth, Research and Innovation (MEYR), launched the One Tablet per Child scheme. This scheme helped to partially fulfil The Framework for the Education Strategy for Malta 2014–2024 (MEDE, 2014) and it aimed to address digital literacy. According to MEDE (2014):

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> There is no way our country can prosper and succeed as a democratic and just society if we retain the current high levels of children with low literacy, numeracy, science and digital skills, the low level of children who master higher-order thinking skills, and the current drop-out rates. (p. 5)

The framework outlines the importance for students to be digitally literate to be able to make it in today's and tomorrow's world since "If our young generation – indeed all citizens – lack digital competencies, they risk being disenfranchised when it comes to employment opportunities, democratic participation and social interaction" (Department of eLearning, 2015, p. 6). Being digitally literate means having "the competence to critically evaluate and weigh the deluge of information coming in through the media and Internet, and the ability to use the information to create, to innovate and have fun" (Attard et al., 2017, p. 10). Bearing this in mind, the Directorate for Digital Literacy and Transversal Skills (DDLTS) works toward helping "educators make the shift from traditional teaching and a traditional pedagogical approach to a 21st-century learning environment" (Department of eLearning, 2015, p. 4). This is done by assisting both educators and students in meeting the four pillars of education as outlined in The Framework for the Education Strategy for Malta 2014–2024 (MEDE, 2014, p. 3).

Statement of the Problem

In order to achieve the goals set out by MEYR, educators must focus on teaching students 21st-century skills. According to van Laar et al. (2020), nowadays society has also developed the need for 21st-century digital skills as there is a high demand for skilled Information and Communication Technology (ICT) workers. These 21st-century digital skills consist of "seven core skills with digital components. The identified 21st-century digital skills are technical, information, communication, collaboration, creativity, critical thinking, and problem-solving." (p. 1).

The study presented in this paper aimed at delving into the usage of the digital resources that are available to both students and teachers in the Junior Years attending state primary schools, in order to understand how these resources are effectively aiding students in becoming students of the 21st century. The research aimed at answering three main questions of both quantitative and qualitative nature. The main quantitative questions to be answered were:

1. Are primary state teachers teaching Junior Years making use of digital resources in the classroom?
   a) If so, to what extent and at what level are they implementing them? Why so?
   b) If not, what are the obstacles stopping them from making use of digital resources?

On the other hand, the key qualitative questions to be answered were;

2. How is the use of digital resources or lack of it affecting the acquisition of 21st-century skills amongst the students?
3. What impact did the measures taken in education during the COVID-19 pandemic have on primary state teachers teaching Junior Years?

The purpose of the research was to produce a real picture of the reality of the classroom in terms of digital resources usage, limitations, and the effects this is having on the acquisition of 21st-century skills.

Theoretical Framework

The Role of the Teacher in the 21st-century Classroom

For the 21st-century classroom to succeed, "teachers must become 21st-century learners themselves, learning from inquiry, design, and collaborative approaches that build a strong community of professional educators" (Trilling & Fadel, 2009, p. 124). A study conducted by Nehring et al. (2019) examined 22 classrooms in public secondary schools in Massachusetts that viewed themselves as advocates of 21st-century teaching. In their results, they outlined that some teachers believed they were teaching 21st-century skills but no evidence was found of such. Their teaching was of low instructional demand based mostly on recall and in the end preparing students for test-taking. They attributed these findings to a lack of training on what constitutes 21st-century skills and how to implement the pedagogy (Nehring et al., 2019). Undeniably, teachers need to have the skills themselves to model and teach them. Kim et al. (2019) state that "it is equally important to prepare and train teachers in not only the acquisition of 21st-century skills but also the dissemination of these skills" (p. 110). According to the Developing Rehabilitation Assistance to Schools and Teacher Improvement Project (Burns, 2012), "student achievement is significantly related to whether teachers are fully prepared in the field in which they teach. Good teachers have strong subject matter knowledge" (p. 103).

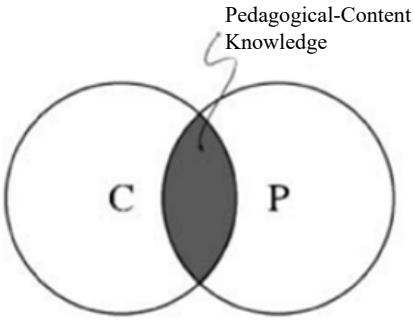
Two frameworks that are commonly used to identify the level of implementation of digital resources are the Technological Pedagogical Content Knowledge Model (TPACK) and the Substitution Augmentation Modification Redefinition Model (SAMR; Saubern et al., 2020).

The TPACK model is based on teaching content using technological tools. TPACK is given great importance in student teacher education. The TPACK model was first invented by Mishra and Koehler (2006). Their visual representation of the model is in the form of a Venn diagram (Warr et al., 2020). "In describing the framework in their 2006 paper, Mishra and Koehler first illustrated how two circles representing CK and PK combined to create PCK [Figure 1) and then how adding a third circle, representing TK, created TPCK [Figure 2], as well as the new intermediate components of TCK and TPK." (Saubern et al., 2020, p. 4). The TPACK Model provides a guideline for educators on how to integrate technology into the classroom successfully.

The term SAMR was invented by Puentedura (Figure 3). In the substitution stage, "tech acts as direct tool substitute, with no functional change" (Puentedura, 2006, p. 2), for example, replacing a printed text with an online one. In the augmentation stage, "tech acts as direct tool substitute, with functional improvement" (Puentedura, 2006, p. 2), for example, use of the internet, or online dictionary. In the modification stage, "tech allows for significant task redesign" (Puentedura, 2006, p. 2). For instance, students can create original material by making use of PowerPoint, apps, and visual and audio aids. The last stage is the redefinition stage, where "tech allows for the creation of new tasks, previously inconceivable" (Puentedura, 2006, p. 2), such as bringing a text to life through the use of narrative tools.

Figure 1

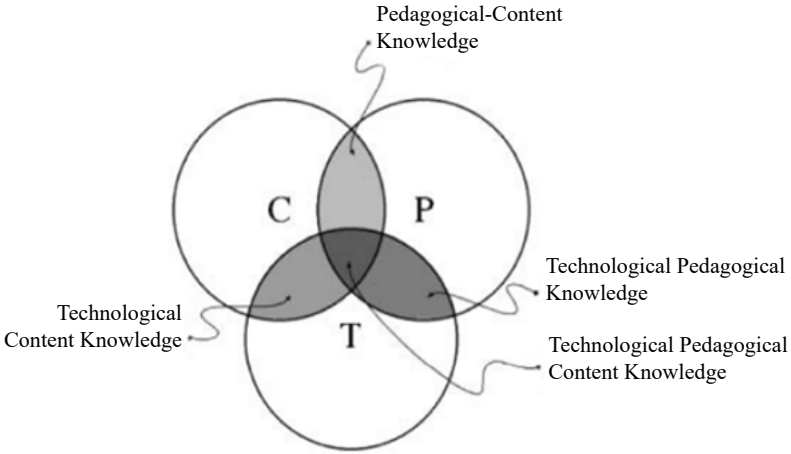
Pedagogical content knowledge as represented in Mishra and Koehler (2006)



Source: Mishra & Koehler, 2006, p. 1022

Figure 2

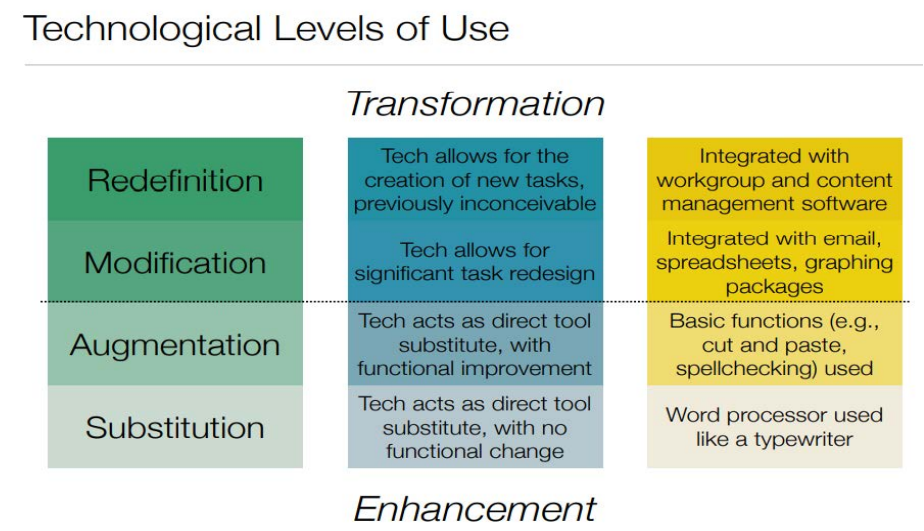
Technological pedagogical content knowledge (TPACK) as represented in Mishra and Koehler (2006)



Source: Mishra & Koehler, 2006, p. 1025

Figure 3

Technological levels of use



Source: Puentedura, 2006, p. 2

Although the SAMR model has four stages, it is not necessary to make use of all the stages at once. When making use of the SAMR model, the teacher has to decide at what point of the lesson they want to introduce the technology and then the level of digital content. For example, during a writing session one might utilise the tablet for the writing (substitution), then get the students to share their work with other students through Google Drive/Class Cloud, so that it can be edited by them (augmentation), and then finally get the students to create a voice-over (modification). Puentedura (2006) also points out how the SAMR model can be amalgamated with 21st-century skills, formative assessment, and also Bloom's Taxonomy. The TPACK model and the SAMR model are often confused to be the same thing, when in reality one focuses on the educator while the other focuses on the content and the level of technology being used. Either way, they both accentuate the use of technology as an enhancer of the learning experience and not a replacement. "Focusing on technology

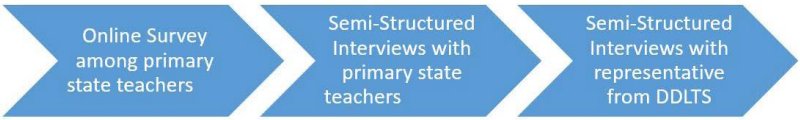
at the exclusion of the core components of teaching and learning – content, curriculum, instruction, and assessment – has been repeatedly tried across the globe, and it has repeatedly failed." (Burns, 2012, p. 90). It needs to assist teachers in reaching their goals.

Methodology

The research method adopted throughout this study was the mixed methods research approach. The term mixed methods research refers to "when researchers integrate quantitative methods of data collection and analysis and qualitative methods of data collection and analysis" (Plano Clark & Ivankova, 2016, p. 56). A mixed methods research approach ensures greater validity and provides different perspectives to the research question posed (Bulsara, 2015). It allows for triangulation whereby the results obtained from the two methodologies are analysed and compared to test for validity. The techniques chosen to conduct the study were surveys and interviews. For the purpose of this study, semi-structured interviews were chosen as these permit probing questions as the need arises and also assist in getting directly to the problem (Duesbery & Twyman, 2020). Due to the COVID-19 pandemic, both the surveys and the interviews were conducted online through the use of Microsoft Teams. To narrow down any misconceptions, for the purpose of this study, 21st-century skills were interpreted as "Learning and innovation skills, information, media, and technology skills and life and career skills" (Trilling & Fadel, 2009, p. 48). This explanation is based on the description put forward by the Partnership for 21st-century skills (Literacy, 2014). The framework that was used to identify and compare the level of digital literacy being taught in the classroom was the SAMR model proposed by Puentedura (2006).

The study involved three phases, as explained in Figure 4 below.

Figure 4



The Three Phases for the Collection of Data

The first phase consisted of an online survey disseminated among primary school teachers around Malta and Gozo that were currently teaching Junior Years. One school from each of the ten state College Networks was selected to provide a holistic picture of the current situation. The selected schools were provided with an online survey to be filled in by the teachers. This survey tackled questions ranging from the type of digital resources that teachers made use of, their extent of usage, and any obstacles encountered. Additionally, teachers were also asked if and how the current situation of COVID–19 pandemic affected their usage of digital resources. The second phase entailed interviews with some teachers (n=7) to confirm the findings that emerged from the surveys. The selected interviewees had not participated in the online survey. These interviews were held online through Microsoft Teams, and the teachers were posed the same questions as those in the online survey. The last section of the study consisted of interviews (n=4) with Heads of Departments (HoD) and teachers of Digital Literacy within the DDLTS. The interviews comprised of several questions that were aimed at supporting or opposing the results gained from the teacher surveys. The questions also explored the type of support that the participants offer to teachers, and the positive and negative outcomes that came about with the COVID–19 pandemic focusing, primarily between March and June of 2020.

The findings were then collected by making use of Microsoft Excel spreadsheets and Google Forms and then analysed through the thematic content analysis approach. The results offer important insights into the issues encountered both by teachers and the Digital Literacy Team and also highlight the struggles and successes that the COVID–19 pandemic brought about. Even though through the application of triangulation the results presented can be supposed to be valid and reliable, the low response rate of the online survey, especially from Gozo College, signifies that this study is unable to encompass the entire Maltese archipelago. Hence, the reader should bear in mind that the findings presented in this paper are based primarily on the nine Malta colleges. Further data collection is needed to clearly indicate the use of digital resources throughout Gozo.

Findings and Analysis

Demographic Data

The study was not focused on any particular age group or gender but rather on individuals that worked directly with students from the Junior Years within state primary schools, that is, students from Year 3 to Year 6. The majority of the teacher participants (n=71) were female (n=60) and came from the age group of 30–40 (n=33). The data collected presents an equal representation of Year 3 to Year 6 teachers: 19 participants teach Year 3, 16 participants teach Year 4, 17 teach Year 5, and 19 teach Year 6. With reference to their teaching experience, the majority of the participants fell between two categories: 5–10 (n=27) and 11–20 years (n=24).

Use of Digital Resources

The first research question in this study, Question 1, sought to determine whether primary state teachers teaching Junior Years are making use of digital resources in the classroom. From the findings, it has emerged that all the Year groups from Junior 3 to Junior 6 are indeed making use of digital resources. Nevertheless, the extent and level that they are implementing them at vary drastically. The majority of the teachers feel that they need assistance before they feel comfortable enough to introduce a new digital resource. Moreover, this study found that the way most teachers make use of digital resources is in the substitution and augmentation stage of the SAMR model. Very few teachers are reaching the modification stage and even fewer are reaching the redefinition stage, which would entail the creation of something completely new. Given that only 23.3% of the respondents feel confident enough about introducing new digital resources without any assistance, such a result is comprehensible. It is interesting to note that the vast majority of teachers (98.4%) make use of online games during their lessons. Teachers also access online videos to serve introduction and consolidation purposes to make the lesson as interesting and engaging as possible. From the findings, it emerged that teachers link the use of digital resources with keeping students engaged, as students enjoy using them. Nevertheless, it was pointed out that students tend to have a short interest level in such things, so innovation is the key to keeping them engaged. Tasks need to be varied and enticing to maintain the students' interest. De Castell (2011) argues that technology can be fun, and it is essential to see what students do

with it and incorporate it into lessons. Observing how a student learns through games can teach teachers a lot about how they can teach a concept to the student.

Another objective of the study, Question 1b, was to determine the obstacles that are stopping or limiting teachers from making use of digital resources. The major issues lie with the infrastructure. This view was also supported by the representatives interviewed by the DDLTS. Having limited access to the internet as well as tablets not working properly ends up wasting a lot of time for teachers and students, and thus the lesson would need to be adapted accordingly. Teachers end up feeling frustrated and think twice before embarking on another lesson involving digital resources. These results are also in line with those defined by another study carried out by Debattista & Zammit (2015) on the One Tablet per Child scheme, where there is even the reference to time management. Of particular interest here is the fact that six years after the study was carried out in Malta the same problems persist.

Support Provided to the Different Stakeholders

Except for a small percentage (12.5%), the majority of the teachers feel that they are being adequately supported by the DDLTS. This sentiment was also echoed by the representatives interviewed from the DDLTS themselves, as they mentioned that even though they are currently short-staffed they are trying their best to reach everyone either online or physically. Some teachers need more support than others, and the fact that support is limited can have a negative effect on the use of digital resources. Other teachers, especially those that have been teaching for a long period, still carry the notion that the Digital Support Teachers are the ones that should be introducing and carrying out lessons involving digital resources and not the class teacher. In accordance with this, in a study conducted by Camilleri (2018) on teachers' temporal adaptation patterns towards tablet PC use, he refers to Lauterbach & Mueller (2014, cited in Camilleri, 2018) who discuss the introduction of new projects. According to them:

> many implementation projects never realise their intended benefits. They fail to deliver either before rollout or else gradually flicker off after going live. This result can be attributed to issues related to organizational or individual resistance during the adoption processes of the new technology by its targeted users. (Camilleri, 2018, p. 468)

Having teachers that are resistant to changes will impact the amount of exposure to digital resources that certain students get. Whilst this study confirmed that every participant was making use of digital resources, it did not outline how frequently teachers were making use of them. During the interviews, it was observed that those teachers that were not so confident with using the tablet limited its use. This observation was also echoed by representatives from the DDLTS during the interviews, who highlighted that some classes would get super-excited when they were to carry out a lesson with them using the tablet. Indeed, the DDLTS representatives voiced concerns about the lack of consistency for students in the use of digital resources, as this varied according to the teacher. These findings further corroborate the importance of providing support, as it is key to the success of creating 21st-century students. The representatives interviewed from the DDLTS gave an overview of the support that they provide to schools, educators, students, and even parents. As outlined from their responses, the support is there, but not everyone is reaching out for it. One implication of these findings is that certain school leaders do not have a clear focus for their school concerning 21st-century skills and digital skills. When the Senior Leadership Team (SLT) has a clear vision for their school, then the rate of success is higher. Support needs to come also from those who encourage the use of technology in the classrooms.

21st Century Skills

The next part of the study, Question 2, was concerned with understanding how the use of digital resources or lack of it is affecting the acquisition of 21st-century skills amongst students. Teachers were asked to place themselves on a Likert scale from 1 to 4, with 1 being the lowest and 4 being the highest. The majority of the teachers (n=42) placed themselves in the third level, which meant that they feel they are indeed equipping their students with these skills, but not to their full potential. When looking at the responses given behind their choice, they referred to critical thinking, entrepreneurship, independent learners, and also future careers. These teachers are showing an understanding that having digital literacy skills has become indispensable. This outcome is also supported by the findings from the interviews with representatives from the DDLTS whereby they stated that they give students the skills to make it in the future.

In contrast to the finding above are those teachers that selected the second level (n=16), and thus it can be suggested that they feel they are only partially equipping their students with 21st-century skills. This result may be explained by the fact that not all teachers value the importance of using digital resources in order for learners to acquire 21st-century skills, as attested by the findings whereby some teachers use them solely for games or as part of their summative assessment. An implication of this is the possibility that not every student is being provided with equal opportunities to gain such skills and hence is being put at a disadvantage. Jia et al. (2016) describe the 21st-century workforce as requiring "students to be able to apply knowledge to complex and challenging tasks using skills such as problem-solving, evaluation, reasoning, decision-making, and the ability to use digital technology" (p. 229). It can therefore be assumed that if the teachers do not provide enough opportunities whereby the students can gain 21st-century skills, they will not be able to prosper in today's workforce.

Implications of the COVID-19 Pandemic on the Usage of Digital Resources

The last part of the research, Question 3, focused on the impact of the measures taken in education during the COVID-19 pandemic on primary state teachers teaching Junior Years. During the pandemic, teachers needed to transition to online teaching as it was the only means available for them to reach out to their students. "All educators were encouraged to provide an educational service for all their students, using online platforms approved by their respective schools or by the Educational Directorates" (Busuttil & Farrugia, 2020, p. 215). Given that at the beginning of the pandemic there was no clear indication of what this shift truly entailed, many teachers were at a loss or astounded. Teachers sought support individually from DDLTS as attested by the findings, and this proved to be a burden to the DDLTS as it increased the already overwhelming workload.

From the findings, it emerged that prior to the COVID-19 pandemic, teachers were not making enough use of the digital resources available, whereas afterwards the usage increased. One of the main explanations behind this result is that participants feel more confident now that they have had time to explore and were provided with a reasonable amount of training. In a study conducted by Camilleri (2018) he argues on the benefits of time. Teachers need to be provided with enough time to adjust to the new changes being implemented, as

the timeframe will have an effect on the success of the technology. In his study, Camilleri also refers to the importance of training as well as experimenting and having constant support at the teachers' disposal. A recent survey (May 2021) amongst 113 primary teachers in Malta conducted by Tech.mt, a public–private partnership created by the Malta Government and the Malta Chamber of Commerce, illustrates how educators are very much in favour of attending training, whereby:

> The majority of the educators (more than eighty-five percent) are willing to undergo training related to the four digital tools (Mobile and/or tablet apps, Augmented reality/Virtual reality tools, Digital Educational Games, and Robotics). Almost every educator is interested to undergo training sessions on Augmented reality/Virtual reality tools (93.9%). (Tech.mt, 2021, p. 22)

It can thus be suggested that the COVID-19 pandemic has left a positive outcome on the usage of digital resources as it brought forward a shift in the mindset of those teachers that were cautious about their use. Teachers have understood the importance of digital literacy and begun to incorporate it further into their lessons. Furthermore, the pandemic also highlighted the need for digital competencies for both teachers and students. This research indicates that teachers are willing to undergo training, but they also need time to be able to experiment on their own.

Recommendations

The study has outlined a number of shortcomings that need to be addressed in order for students to be truly prepared for the 21st-century workforce. Based on these shortcomings a set of recommendations are being put forward.

Training and Support

The evidence from this study suggests that prior to the COVID-19 pandemic not enough training was being provided to teachers. Due to this, coupled with the lack of time for exploring, teachers were not making enough use of digital resources that would enable their students to become digitally literate, which is an indispensable skill if they need to succeed in the Knowledge Age. The current data highlights the importance of training and support for all the stakeholders involved, that is, SLTs, teachers, and students. First and foremost, the SLT needs to be inclined towards digital technology. They need to recognise the importance of digital literacy and encourage teachers to make use of the

resources available. Moreover, they need to establish a clear vision of where they would like their school to stand in relation to digital literacy. With support from the DDLTS, they can create different goals that will be incorporated within the School Development Plan. This support is already being provided by the DDLTS, but greater efforts are needed to ensure that SLTs are reaching out and making use of this support. With regards to students, teachers need to teach them how to filter spam and help them understand what putting material online really entails. Digital literacy does not only incorporate learning to use a tablet or web browser, or create a program, etc., but also to evaluate and understand that what is available online is not always the truth – some information might be false. Teachers need to assist students in becoming critical thinkers and evaluating the information that is available to them.

Additionally, teachers need to also be on board with regards to digital literacy. As demonstrated by the findings, the COVID-19 pandemic contributed to a shift in the mentality towards digital resources as it paved the way to a more positive attitude. Nevertheless, teachers need to also start considering the different types of jobs available that revolve around digital literacy. There needs to be a balance between preparing students for traditional jobs and for evolving jobs such as vloggers, bloggers, and influencers. The fast pace at which technology and trends are changing does not make it easy for a teacher to keep up, and therefore, training and support need to be consistent. Continuous teacher professional development is crucial for successful 21st-century learning, and the findings reported in this study indicate that more time needs to be devoted to teacher training. Moreover, the study suggests that teachers are mainly reaching the first two levels of the SAMR model. Teachers need to be given training and guidance on how to best reach the other two levels of modification and redefinition. As discussed throughout the study, some teachers lack digital skills themselves. Busuttil and Farrugia (2020) deliberate on the dual role of teachers in relation to technology use. Teachers:

> serve as a role model and hence need to be equipped with digital competencies to participate in a digital society and they also need to possess educator-specific digital competencies to be able to effectively use digital technologies during teaching. (Redecker, 2017, p. 217)

Therefore, for teachers to begin exploring all the levels of the SAMR model they need to be provided with specific guidelines on how to do so that encompass lesson examples and demonstrations.

Infrastructure

The study also highlighted the importance of having a solid network and the right tools to work with. All stakeholders need to be provided with good quality tablets/laptops and these should be replaced accordingly once they become obsolete. Additionally, broadband should be strong enough in schools to support all the students being connected at the same time as internet access has become essential for learning. The inadequacy of internet connectivity is one of the major issues pointed out by the participants that hinders the usage of digital resources in the classroom. Moreover, technical support should be readily accessible.

Resources

During the interviews held with teachers, those teachers that happened to be teaching Year 3 students referred to the limitations they encountered since they did not have access to tablets. It is being recommended that a number of tablets are stationed in each school so that primary teachers teaching Year 3 and also Early Years could make use of them as needed. In his paper on the charter for 21st-century literacies, Seguna (2021) observed a number of students in Year 1 who had access to tablets during the lessons. He reports how teachers used the tablets for teaching Maltese phonemes through the application of *Naqra Naqra* and how this was beneficial for the students' learning and understanding of the Maltese language. By having tablets at their disposal, students would benefit from exposure to the features of the tablet and utilise it to learn how to take photographs and also practice typing besides using it for educational games. Given that students are now being exposed to technology from an early age, certain issues could be dealt with at an earlier stage such as clicking on pop-up adverts while watching a video.

Digital Literacy Guidelines

The last shortcoming emerging from the findings was the lack of an official digital literacy syllabus. The National Curriculum Framework 2012 encompasses digital literacy through the cross-curricular section, and therefore, no guidelines are provided to teachers as to what they need to teach their students. This leaves teachers without targets, and thus, some students could end up leaving primary school without having gained certain digital literacy skills. Having a set of guidelines of what skills students need to have acquired by the end of their primary education would assist teachers in preparing them better as well as making sure that all students are given the opportunity to gain digital literacy skills. Moreover, it would also assist in emphasising the importance of digital literacy. One final recommendation pertaining to this category is the need to include a digital literacy policy within the School Development Plan. This would help establish continuation and consistency from one year to another, and limit the discrepancies arising between certain classes within the same year group and also from one year group to another, as each year group would be provided with a set of targets that need to be reached by the end of the scholastic year.

Conclusion

The results obtained from this research suggest that the work currently being carried out by MEYR has not yet reached the desired outcomes of creating:

> (i) Learners who are capable of successfully developing their full potential as lifelong learners; (ii) Learners who are capable of sustaining their chances in the world of work and (iii) Learners who are responsibly engaged citizens who are able to secure social justice in constantly changing local, regional and global realities. (Ministry of Education and Employment, 2012, p. 8)

Even though teachers are making use of digital resources, the way they are using them is not fully contributing towards this goal. There is a definite need for more training and support for teachers in order for them to be able to maximise the full potential of the digital resources currently available to them, and thus truly assist students in becoming 21st-century students.

In summary, this research has provided a deeper insight into the usage of the digital resources that are available to both students and teachers in the Junior Years attending state primary schools. It has portrayed a picture of

the reality of the classroom in terms of digital resources usage and limitations and the effects this is having on the acquisition of 21st-century skills. Finally, it has demonstrated how the COVID-19 pandemic has had a positive impact on the usage of digital resources. The pandemic served as the catalyst that was needed for the shift in the mindset towards digital literacy to occur. Nonetheless, it is now up to all the stakeholders involved to continue building on this development to reach the outcomes set out in the National Curriculum Framework.

Notes on contributor

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