

# ICT tools in Designing Preschool Educational Activities on Historical Events

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**Abstract.** Digital technology is advancing at a rapid pace today. During the Covid-19 pandemic, the forced transition to e-learning promoted non-traditional work practices and time-sensitive tools. In Greek universities, like in most parts of the world, the lockdown changed curricula and lecturers responded by modifying course designs. Different academic disciplines and specific topics began to be delivered in different ways using the non-traditional teaching approaches of microlearning. In this study, conducted during the 2021 spring semester, we reviewed the digital material that undergraduate students studying to become teachers had prepared as part of their ICT course. One hundred seventy students completed their teaching internship reports with the help of digital infrastructure and ICT tools. The students were asked to deliver a preschool lesson addressing the historically significant topic of the Greek Revolution of 1821. Participants used 90 different ICT tools, lying in 5 categories: web search engines, social media, game-based learning platforms, collaboration platforms and task-specific tools. These ICT tools had different functionality, as some helped to create digital material, some helped to edit it, while others served to transmit it through online communication channels. Digital material and ICT tools can enhance and support educational experiences by providing various pathways to overcome the possible disruptions caused by the Coronavirus Era.

**Keywords:** ICT Tools, Digital Material, Digital Infrastructure.

## 1 Introduction

With each passing day, there is a growing demand for information, resources and materials to be made available in digital form to assist with humanity's various activities in different domains and world regions [1-2]. Digital material is content accessible usually by computers. It can be born-digital, i.e., originally designed digitally, such as a web page, or converted to digital through digitization, like a printed page that was scanned using an electronic infrastructure [3]. To digitalize means "to change something, such as a document, into a digital form, that is, a form that can be stored and read by computers" [4].

Digital technology is advancing faster than any innovation in our history, according to the United Nations e-resource [5]. Digital documents, literature and art, photographs and e-books are replacing the familiar conventional storage media that mankind has been using for centuries. A significant share of digital materials has special value, and therefore must be protected and preserved for current and future generations [2, 6]. Digital heritage may exist in any language, in any part of the world, and in any form of expression the creator chooses to make it applicable to the relevant industry [2, 6].

Information and communication technology (ICT) tools provide varied digital material forms. This term often refers to various digital tools, such as software or applications that can be used for different purposes [7]. Each ICT tool has one or more functional tasks: file creation (e.g. video, audio), editing (e.g. texts, images), data transfer, etc. [7]. Other sources in the scientific literature define ICT tools as digital infrastructure, such as personal computers, laptops, tablets, printers, scanners, interactive whiteboards, etc. [8]. However, the most comprehensive definitions of the ICT tools term include technologies, devices and interaction concepts [9].

The role ICT plays in education today is emphasized by researchers [10-12] and leading institutions. The United Nations Educational, Scientific and Cultural Organization (UNESCO) is the leading global agency responsible for providing good practices and guidelines for ICT use to disseminate knowledge at all levels [13]. In the face of the Covid-19 pandemic, UNESCO has facilitated the teaching and learning resources distribution to support educators and students [14]. Similarly, a list of national learning platforms and ICT tools was published [15]. These platforms were launched by the Ministry of Education, including online books and TV programs aimed at students in Greece [15]. The implementation and use of ICT tools in the educational context offers new educational pathways. In particular, the ability to create and distribute digital materials away from the classroom facilitates the development of non-traditional work practices such as microlearning [16-17], project-based learning [18-19], and the flipped classroom approach [20-21]. The teaching and material design scenarios across various academic disciplines in universities, schools and kindergartens around the world have become problem-oriented [22-24].

The aim of this study is to examine the digital material prepared and used by prospective teachers, in their placement experiences, during their undergraduate studies, when teaching history to preschoolers. The study intends to identify the preferred ICT tools participants used in preparing and delivering digital materials related to history.

## **2 Materials and Methods**

### **2.1 Design and participants**

At the University of Ioannina, Greece, the entire academic year was delivered online due to the social distancing measures imposed by the Covid-19 pandemic, since the start of the lockdown until now (at the time of writing this paper). All lecturers and students continued to engage in collaborative work on the Microsoft Teams business communication platform.

In the e-learning environment, the University's Early Childhood Education Department lecturers offered students a variety of different approaches to master deep knowledge and understanding of the curriculum they participated in. This study is based on an undergraduate ICT course that applied the microlearning approach. The microlearning approach assumes that the learner step by step acquires some skills and knowledge within a short period of time [25], moving towards micro perspectives on and the significance of micro dimensions in the process of learning. A structured plan, time, content, mediality and teaching materials are of particular importance to this pedagogical practice [25].

Students in their 3<sup>rd</sup> year of studies, studying the spring ICT module, were asked to develop a lesson plan on the historically and socially relevant topic of the Greek Revolution of 1821. This was the lesson topic that the preschool teachers-to-be had to prepare and present as part of their placement with preschoolers. The lesson contents had to be structured in such a way as to be easily understood by the young learners, emphasizing micro-content in small timeframes. The preschoolers could be introduced to any aspect of the Greek Revolution: famous personalities, significant events and the War of Independence causes or consequences.

One hundred seventy participants gave their consent to complete the task and share their assignment reports in platform-relevant formats to the appropriate module channel on Microsoft Teams. Ethical implications were met and participants were made aware of their right to withdraw, anonymity and confidentiality.

## 2.2 Data analysis

The student-prepared digital material were presented in DOC and DOCX (Microsoft Word files), PPT and PPTX (PowerPoint), PDF (Adobe), MP4 (video files), and JPEG and PNG (image formats). These formats are available in preview mode (web view) in the Microsoft Teams relevant group channel.

Data analysis was based on descriptive statistics.

Students' reports were classified based on the list of digital infrastructure engaged in their work and the list of the ICT tools used based on popularity and functionality.

## 3 Results and Discussion

The number of the ICT tools used by the participants when preparing for and delivering the lesson were 90, with mean = 9.4588235; median = 10; mode = 10. These different ICT tools referred to 5 categories: web search engines, social media, game-based learning platforms, collaboration platforms and task-specific tools (Table 1).

**Table 1.** A complete list of the ICT tools identified during the study.

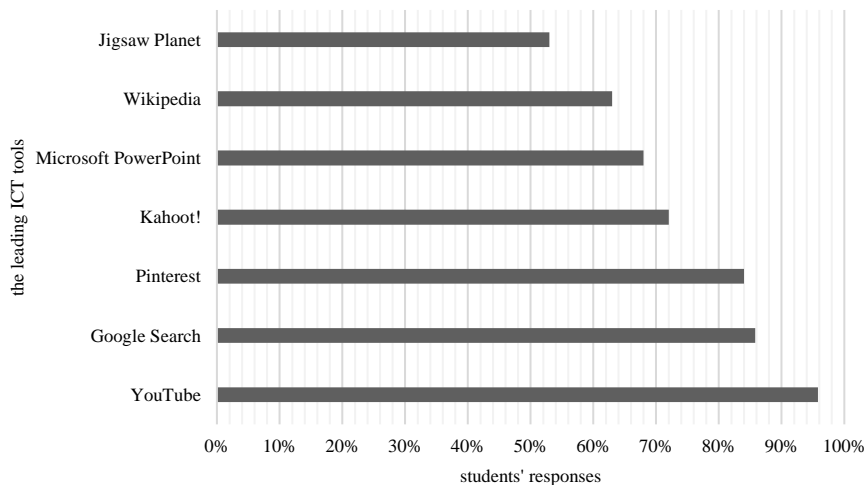
ICT tool name	ICT tool type	Number of references by students
YouTube	Online video platform	163
Google Search	Web search engine	146

Pinterest	Social media platform	143
Kahoot!	Game-based learning platform	123
Microsoft PowerPoint	Presentation program	116
Wikipedia	Online encyclopedia	107
Jigsaw Planet	Game service	90
Padlet	Knowledge management service	80
Canva	Graphic design platform	65
Skype	Videoconferencing platform	51
Wordwall	Game-based learning platform	51
Google Maps	Web mapping	45
Microsoft Word	Word processor	44
Facebook	Social media platform	37
SlideShare	Slide hosting service	30
ThingLink	Interactive media editor	20
Google Drive	File hosting service	19
Instagram	Social media platform	19
Tux Paint	Raster graphics editor	17
Gmail	Webmail	16
Edmodo	Social learning network	14
Microsoft Sway	Presentation program	11
Google Forms	Web survey	10
Piktochart	Infographic software	10
Cisco Webex	Videoconferencing platform	9
Google Scholar	Bibliographic database	9
Prezi	Presentation collaboration	8
Vimeo	Video hosting service	8
WordArt	Online art creator	8
Google Docs	Word processor	7
MyPuzzle	Game service	6
Edpuzzle	Assessment-centered platform	5
Microsoft OneNote	Notetaking software	5
Storyjumper	Storybook creating platform	5
Powtoon	Video maker & animation software	4
ScratchJr	Visual programming language	4
Twitter	Social media platform	4
Windows Movie Maker	Video editor	4
Audacity	Digital audio editor	3

Educaplay	Educational games generator	3
EdWordle	Word clouds editing platform	3
Socrative	Assessment-centered platform	3
StoryboardThat	Digital storytelling	3
Bee-Bot	Game service	2
Blogger	Blog hosting	2
Crossword Labs	Game service	2
Firefox Browser	Web browser	2
Google Classroom	Educational software	2
iTunes	Media player	2
PicPick	Screenshots editor	2
SurveyMonkey	Online survey	2
Tayasui Sketches	Digital drawing platform	2
WordPress	Blog software	2
Zoom	Videoconferencing platform	2
Apeaksoft Video Editor	Video editor	1
Book creator	Digital storytelling	1
Chrome Music Lab	Music editor	1
Filmora Video Editor	Video editor	1
Freemake Video Converter	Video editor	1
Gadwin Printscreen	Screenshots editor	1
Google Chat	Communication software	1
Google Earth	Virtual globe	1
Google Meet	Communication software	1
Google Translate	Neural machine translation	1
ibis Paint X	Graphic design platform	1
LinkedIn	Social media platform	1
Magisto	Video editor	1
Mentimeter	Presentation program	1
Messenger	Social media platform	1
Microsoft Teams	Collaborative platform	1
MindMeister	Mindmapping	1
myStorybook	Digital storytelling	1
Nearpod	Game-based learning platform	1
Notability	Note-taking service	1
Planner 5D	Design software	1
Quizzz	Game-based learning platform	1

Quizlet	Game-based learning platform	1
Rakuten Viber	Instant messaging	1
Sketchpad	Drawing & animation software	1
SlidePlayer	Slide hosting service	1
SnagIt	Screenshots editor	1
Spin The Wheel	Game service	1
Spotify	Music streaming service	1
Unsplash	Stock photography	1
Visme	Presentation program	1
Web QR	QR code scanner	1
Weebly	Web hosting service	1
WhatsApp Messenger	Instant messaging	1
Wix	Web hosting service	1
YouCut	Video editor	1

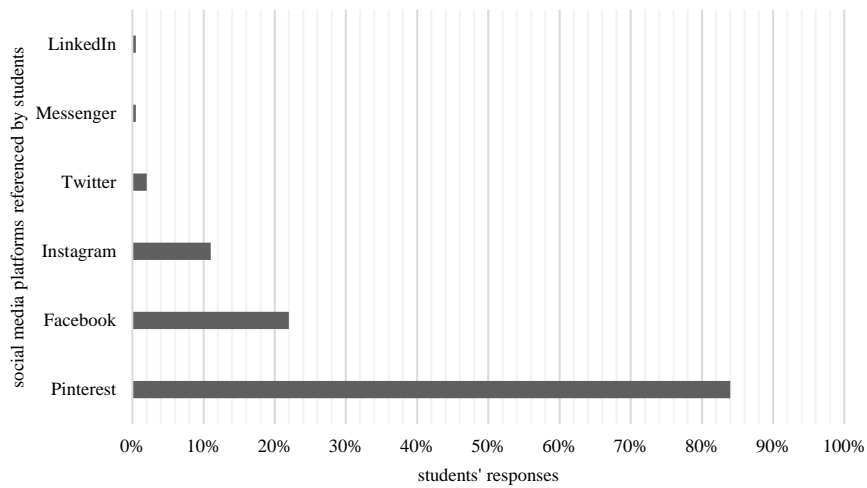
According to Table 1 and Figure 1, the most popular ICT tools used among students were: YouTube (referenced by 95.8% of students), Google Search (85.8%), Pinterest (84%), Kahoot! (72%), Microsoft PowerPoint (68%), Wikipedia (63%), and Jigsaw Planet (53%). The other ICT tools on the list were used by less than 50%.



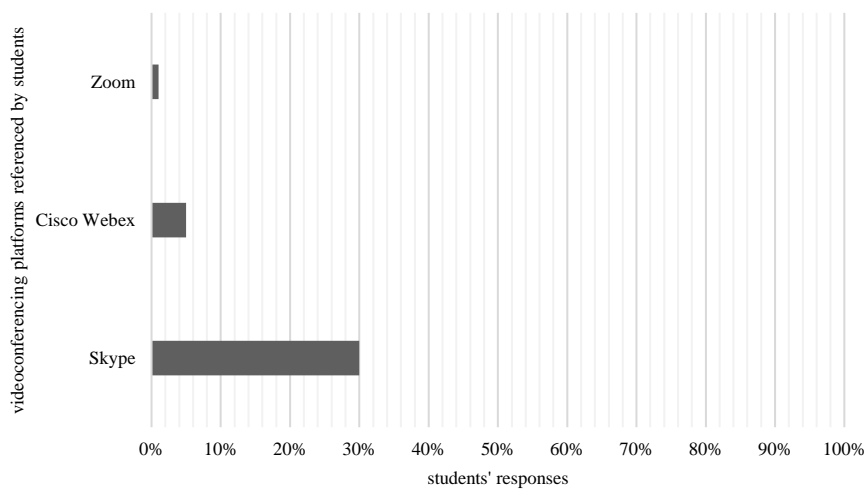
**Fig. 1.** The most popular ICT tools used among students in this study

Each ICT tool has one or more functionalities. Some tools have a specific purpose and perform on one specific task. Other tools can be described as multitasking. Hence, YouTube could be used as both a video hosting service and a social media platform.

There were six different social media platforms (Fig. 2) and three videoconferencing platforms (Fig. 3) identified, through which remote communications with preschoolers, the university community, and peers took place.

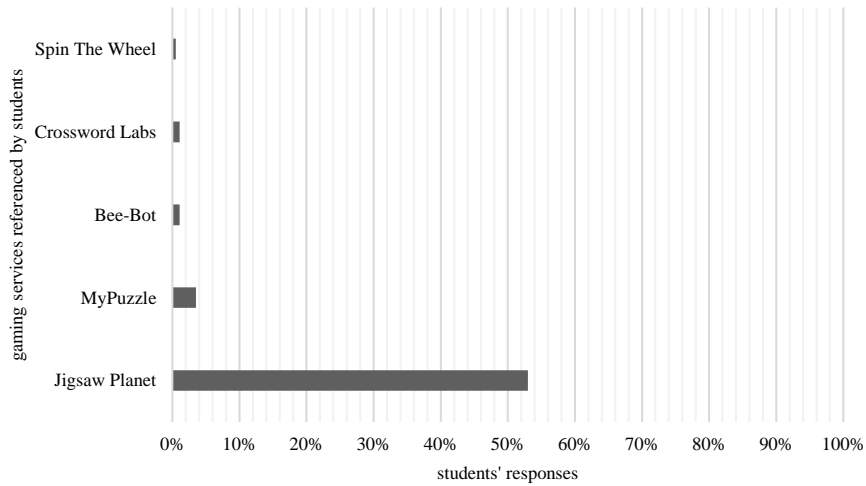


**Fig. 2.** The most popular social media platforms used among students in this study

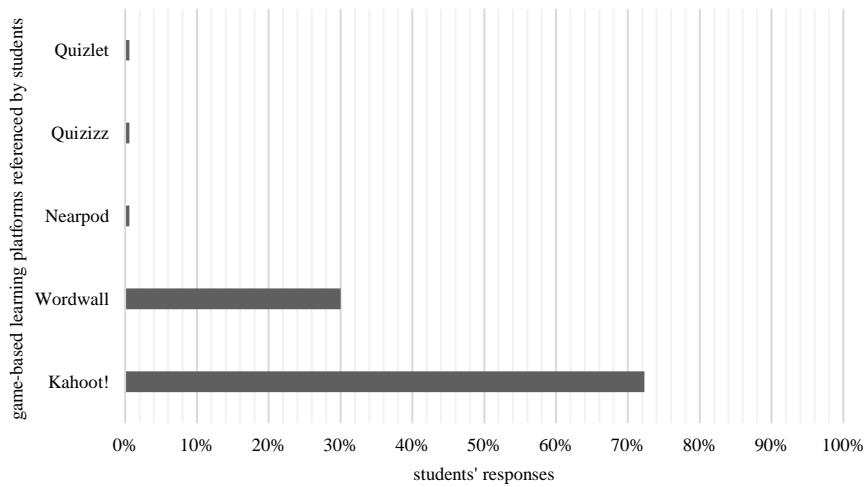


**Fig. 3.** The most popular videoconferencing platforms used among students in this study

Five gaming services (Fig. 4) and five game-based learning platforms (Fig. 5) were reported, allowing to confirm the usefulness and relevance of gamification in the young children's learning.



**Fig. 4.** The most popular gaming services used among students in this study

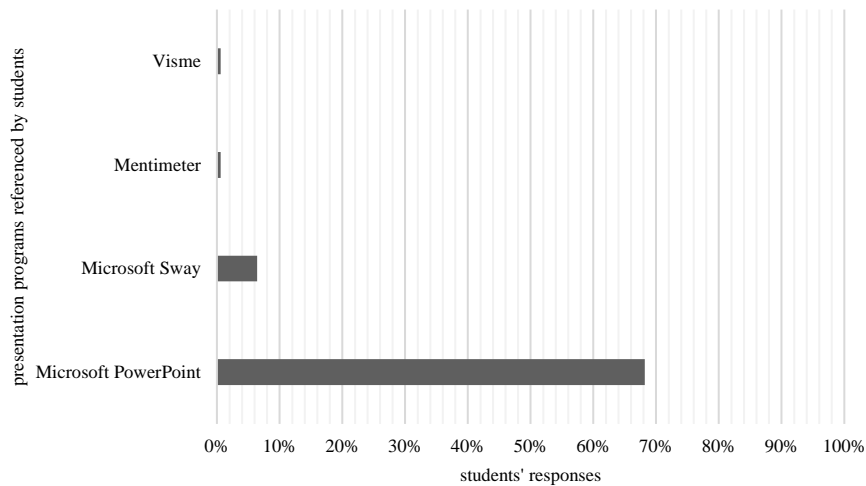


**Fig. 5.** The most popular game-based learning platforms used among students in this study

In addition, programs for data editing were encountered a few times: video (8), graphic (4), and audio (2 times).

In presenting information to preschoolers and setting the theme of the activity, students often used the presentation format, which was confirmed by the consideration of four different programs for creating presentations (Fig. 6).





**Fig. 6.** The most popular presentation programs used among students in this study

Students who indicated the digital infrastructure they would use most often mentioned tablets, personal computers, laptops as well as interactive whiteboards, projectors and music speakers to present digital material. Some students noted that they needed to transform digital material into paper-based materials to meet their work needs and thus, would apply a combination of digital and non-digital resources to preschoolers. In these cases, students would use printers to print digital files.

## 4 Conclusions

Findings showed that when preparing history lessons for preschoolers, undergraduate students studying to become teachers employed a wide range of ICT tools. These ICT tools and digital material can be used in a number of ways in the educational process. They can be applied as a way of introducing the topic, or as a way of engaging preschoolers in interactive tasks, or as a way of setting problems and reflective activities. Among the tools used, we identified five main categories: social media, game-based learning platforms, collaboration platforms, web search engines, and task-specific tools for working with text documents, videos, images, and other multimodal stimuli. Students used standard digital infrastructure such as personal computers, laptops, tablets and special equipment to present digital material when preparing for and delivering the lesson.

In the compulsory e-learning environment imposed by the Covid-19 pandemic, the microlearning approach allowed the School of Education students at the University of Ioannina to explore and engage with their ICT module without disruptions. On the contrary, new avenues and opportunities to develop their ICT skills considering digital material and ICT tools as part of the educational process were experienced. Students used a variety of digital tools as part of their placement experience, through the creation,

design and presentation of small learning units and short-term learning activities. Historically significant issues relevant to the Greek people were introduced to young children.

We see the global digitalization process in education as a positive development. The availability, accessibility and effective use of digital material makes it easy to share and critically reflect on information disseminated through the digital world. The issues related to the abovementioned availability are now on the agenda: data access security and information reliability. However, these are ongoing issues to be researched in the future. To sum up, the educational context is undergoing change and is evolving so as to enable the unfamiliar communication channels and tools to be employed, developed and mastered by all users at all ages.

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