The Extent to which Human Computer Interaction Impact KG Pupil's Perception during COVID-19 Pandemic

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Abstract

While the COVID-19 epidemic impacted most educational sectors, kindergarten students were the most impacted, given that remote learning for children under six requires close parental support. They frequently lack familiarity with platforms, computers, and smart devices used for remote learning. Along with the outbreak of the COVID-19 epidemic, which prompted a review of educational methods and the development of a suitable and flexible alternative method of delivering educational content, the COVID-19 epidemic prompted kindergarten students to complete their education at home, posing a new challenge for parents. Teachers, parents, and kindergarten children conducted a study to ascertain the viewpoints, behaviors, and factors that influence pupils' embrace of instructional technology and the effectiveness of their use of computers and smart devices during the Covid-19 epidemic. In this paper, a questioner has been established to study the effectiveness of their overall outcomes during COVID-19 pandemic. The findings of this article indicate that youngsters at this level have difficulty integrating their teachings during the COVID-19 outbreak. The writers discussed and proposed remedies to each of these issues.

Keywords:
Human-Computer Interaction, E-learning, Children-Computer interaction, COVID-19.

1. Introduction

Teaching and learning have changed dramatically in the modern world because of the adoption of new methods and innovations that have advanced the educational system by piquing students' interest in learning using technological resources such as computers, smart devices, iPads, and smartphones, particularly among pre-school students. Today's children prefer to utilize and communicate with information and photos found on computers and smart devices rather than in print media. As a result, the Internet plays an essential role in their lives [9]

Considering that computers and smart devices are becoming increasingly commonplace in today's world, kindergarten teachers must carefully consider the impact and role of computers, smart devices, and technology in children's lives, both on the educational and non-educational fronts, to make informed decisions like health, learning…etc.

It can be said that the study of the interaction of children with smart devices is related to the design, evaluation, and implementation of interactive computer systems for children. As a result, most of the research on the interaction between man and child and computers and smart devices focuses on design first, then evaluation, and then implementation. As a result of this, the interaction between children and smart devices can be defined as a field of scientific research related to the design, evaluation, and implementation of interactive computer systems for children [10].

The kindergarten stage is regarded as one of the most critical in an individual's life in terms of the balanced and integrated development of his personality; to accomplish this, we must work on developing specialized practical programs based on games and graphics, as well as any other pillar concerned with the development of multiple aspects for children.

The World Health Organization (WHO) confirmed the outbreak of a global pandemic, As a result, all

countries issued decisions to limit the spread of the disease, including the closure of schools, kindergartens, and nursery schools [12].

In the wake of the COVID-19 outbreak, the educational field has seen a sea change, with a large technological gap exposed in how technology might be employed in pedagogically valuable ways to improve teaching and learning [12]). Because of this pandemic, we needed to adapt and begin working on e-learning, mobile learning, and remote learning. Additionally, we needed to train children to use smart devices such as smartphones and tablets to complete learning process.

E-learning (also known as eLearning) is a website that provides educational content via electronic media. E-learning is a broad term that refers to various media that enables students to learn through video, audio, text, images, animation, and other methods [9] The development of games and websites for pre-school children using smart devices is one of the most promising ways to improve the learning experience for these youngsters. Until kindergarten pupils connect with smart devices, the process is simple, smooth, enjoyable, and effective. In line education, you may learn at your own pace, and students can access the information at any time and from any location [9] Compared to traditional classroom education, an essential characteristic of the new education integrated with information technology is that it does not require the teacher and children to simultaneously be in the same room [3]

The use of interactive media by pre-school children is becoming increasingly common in today's increasingly digital society, which is a good thing. As a result of the epidemic, this paper will explore the impact of Human-Computer Interaction and e-learning in Kindergarten and how to deal with them in the classroom. Our study concentrated also on kindergarten in Jordan and specifically at Tafila Governorate as a sample of Jordanian kindergarten. We have reviewed the tools, ways and methods they used during the e-learning tools during Covid19

epidemic, to explore the challenges and weaknesses points and then provide recommendations. Further details are included in following sections.

The rest of the paper is organized as follows. Next section summarizes the previous work followed by Methodology section, then Analysis   and results section. Finally, we conclude the paper and suggested future works.

2. Previous work

The previous work concentered on the papers that has been recently discussed related to HCI influence concept in e- learning for children and their cognitive and reactions. Mainly problems and findings are included for each paper literately reviewed. We also reviewed published papers that concentrated on mental health indicators during COVID19.

Pre-school children's involvement with interactive technology has been studied in [1], this study refers to a tablet and a "Catch-the-Stars" application that preschoolers interact with to accomplish specified objectives. Authors found that Pre-school children's touch performance when interacting with interactive technology is the study's primary focus. Tablets, say Child Computer Interaction (CCI) experts, are currently one of the most promising tools to improve Pre-School children's educational experiences.

Recent studies in CCI and its framework CCI have been summarized in [2]. and discussed in detail to develop more educational applications and better understand children's cognitive and neuromotor development while they interact with smart devices. With the help of a new mobile app, unique data collection methods, and the initial release of the CCI dataset [11], the authors' framework includes the ability to conduct longitudinal investigations. Children use a tablet in various ways, including with a pen stylus and their fingers, to engage in a wide range of activities.

Studies of games used in kindergarten education and an analysis of the technology that underpins them were offered in [4]. Each technology's challenges were also discussed, emphasizing the specific requirements and impairments of high-demand users. The authors offered a possible research route for academics, game designers, and HCI researchers in the field of game-based kindergarten instruction enabled by the latest technology.

Researchers in [5] discussed the three most important technical areas related to education, including intelligent educational agents' capabilities (artificial intelligence and natural language processing), Predictive Algorithms' Scope in Education (Deep learning and big data), as foundational elements for the creation of the next generation of intelligent multimedia interactive interfaces for educational purposes in 2D and 3D.

A child-display interaction approach to avatar-based touchless gestural interfaces has been studied in [6]. They concluded that huge displays are an excellent way to encourage children's views and involvement, such as when they're learning about art. One hundred seven children aged 2 to 10 years were recruited to participate in a study to contribute to the literature on standard displays and child–computer interaction by sharing their findings. They intended to find out if an avatar (movable or immobile) is easy for children to engage with, thereby overcoming "affordance blindness,"; and if an avatar-based touchless interface is engaging and fun, which can help children remember what they've just learned (learning about art). A study was conducted on two-handed interactions and affordance blindness. Authors provided evidence that their chronological age influences a child's ability to interact with an avatar. According to authors, avatars may be used to help develop new educational tools for youngsters.

The perceived usability of Microsoft Teams as a reference platform was analyzed in [7]. They used the Technology Acceptance Model and the System Usability Scale to evaluate the technology. Unifying and simplifying usability testing was the project's goal. According to findings from the survey, TAM's Perceived Ease of Use construct had the greatest in common with SUS in a large-scale student poll. Additionally, the study examines if the digital divide (mobile vs. web environment) affects perceived usability in underdeveloped countries like India. According to the data, there is no influence on usability while employing the consumption method.

During the COVID-19 remote schooling period, an online survey and an advance interview analysis were conducted and analyzed in Finland, as described in [8]. Specifically, the study focused on technology issues in the family environment, reporting on the various applications that parents, and children had to deal with, cultural, organizational difficulties, techniques for sharing information and communications technology equipment among families, and the high levels of flexibility expected from parents and other stakeholders to facilitate remote learning.

Students would be able to learn math while playing the game, according to the methodology suggested in ([9] Use case diagrams, a user interface, and a class diagram to build the database model for mobile games in the form of a use case diagram. To make this mobile game application more user-friendly, we've added app reviews, user rankings, and a forum.

Research in [13] aims to establish the many dimensions and needs for enhancing software quality and highlight challenges that arise when software quality is constrained. Software quality and quality measurement are being examined as part of this research. When it comes to software quality and size, there is a need for a quality standard. Software quality was examined in the study, which included usability. Software quality is becoming increasingly important, according to the findings of this study.

According to [14], the impacts of computerized educational software on the achievement of third-grade students in Jordanian

Arabic language acquisition were investigated. To meet the study's objective, the researcher developed computerized instructional software and an achievement exam that assessed the reading and writing abilities of third-grade pupils. The validity and dependability of the study tools have been established and proven. The findings demonstrated that using computerized educational software as a teaching strategy resulted in statistically significant changes in the achievement of third-grade learners in the Arabic language (reading and writing) compared to using traditional methods.

In [15], The level of use of smartphones and their apps in the acquisition of some gymnastics abilities among students at Mut'ah University's college of sports sciences was determined. The findings indicate that smartphones and their applications in acquiring some gymnastics skills are at an intermediate level. The findings also demonstrate statistically significant differences in the level of use of smartphones and associated applications in acquiring some gymnastics abilities among students at Mut'ah University's college of sports sciences.

In [16] investigated into the links between school administrators' COVID-19 fear, work–family conflict, and family–work conflict, as well as their life satisfaction. The authors discovered that school administrators in the younger age groups had higher levels of COVID-19 phobia and work–family/work–family conflict than their peers in other age groups. They emphasized the significance of devising ways to mitigate the pandemic's effects in order to improve staff productivity in the long run.

(researchers in [18] investigated the links between COVID-19 quality of life, loneliness, happiness, and Internet addiction. They discovered that loneliness and happiness had a negative relationship in several studies conducted prior to the COVID-19 epidemic. The relationship between the two factors was favorable in the authors investigation, which was undertaken during the epidemic. COVID-19 has a direct impact on the quality of life, Internet addiction, loneliness, and happiness of school administrators and instructors. It was also shown that Internet addiction has an indirect impact on the relationship between loneliness and happiness.

In [17] looked at the links between COVID-19-associated psychological distress, social media addiction, COVID-19-associated burnout, and depression. COVID-19-related psychological distress was found to be a major predictor of COVID-19-related burnout in the study.

Through a bibliometric study of publications focused on management, leadership, and administration related to COVID-19[19] gave topic and methodological recommendations for future sustainable research programs. The findings of the investigation revealed that articles about COVID-19 were subjected to a lightning-fast editorial review before being published. In this context, international journal editors may be argued to have a clear responsibility to pass COVID-19-focused manuscripts through a healthy referee process to maintain their journals' publication standards and uphold the scientific study's ethics.

3. Methodology

We gather information from various sources, including kindergarten information and direct interviews with children who may be able to reach under the circumstances of the COVID-19 outbreak. During the investigation, the researchers documented their observations by writing down and reporting how kindergarten students interacted with one another and to what extent the pandemic had an impact. Thus in-person interviews have been conducted with children and other involved parties for monitoring and reporting.

With the help of teachers from multiple schools, our team determine how the epidemic has affected students' willingness to study, their ability to grasp the material, and their acceptance of e-learning and the available technologies used. These tools will

be studied to see how youngsters interact with them and their sound and adverse effects.

Teachers, parents, and kindergarten children in the Covid-19 pandemic were asked to participate in a survey to learn about their thoughts, practices, and variables that influence their use of educational technology and the value of their time spent on computers and smart devices. It was thought that an online survey was an excellent tool to get information from teachers, parents, and students in response to research questions because of COVID-19's social isolation settings. During the COVID-19 pandemic, Google Forms was used to design a questionnaire to analyze the impact of human-computer contact on the benefit of kindergarten students during school closures. Teachers, parents, and kindergarteners in Jordan's Tafila Governorate (south of Amman) were the primary subjects of the study. This is a cross-sectional study sampling the possibility of human interaction with a computer and smart device on the benefit of kindergarten pupils during the COVID-19 pandemic.

The study included 188 people, including teachers, parents, and kindergarten pupils (their answers were filled out with the help of parents). Moreover, the percentages of the answers were distributed as follows (teachers by percentage 21.5%, parents by percentage 51.1%, and kindergarten students by percentage 27.4%. (See Figure 1: Targeted Group).

To speak with the teachers, we organized a conference call through the Zoom app. After the meeting, four questions were posed to teachers in attendance, and we received the responses we needed. We'll go into greater depth in the following two sections.

1. Analysis and results

Study participants were from Tafila Governorate in southern Jordan: 97 parents; 40 teachers; and 51 kindergarten students.

Figure1: Targeted Group

4.1 Parents:

Table 1: Questioners' construction of parents (positive answer)

Sample name	Number	Q1	Q2
Parents	97	81.4	53.6

There were 73% mothers and 21% fathers among the participants. According to the study, the mother is the primary source of follow-up for kindergarten students. The first question is Parents' Question Ratio: How would you rank the distant education experience of your child? "An ineffective experiment" was the answer with the highest
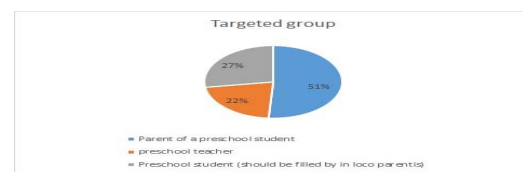
proportion (81.4%). The second question was about the difficulty of using e-learning platform, the opinions were somewhat similar for people who face difficulties in using the platform (46.4%) and those who do not face difficulties (53.6%).

The questionnaire found that (60.1%) of parents think that the distance learning experience is challenging for them, which negatively affects their children's education.

4.2 The teachers

57.5 percent of female teachers try various ways to give educational information to kindergarten students despite the weak Internet infrastructure, whereas 22.5 percent cannot supply educational content because of the Internet's weak infrastructure.

Inquiring with the female teachers about whether they need to be trained on how to use the e-learning platform, even though a sizable majority of female teachers (72.5%) agreed that the e-learning platform was straightforward to use, the low percentage of female teachers who agreed that training

workshops were necessary to master the platform's use shows that female teachers' relationship with computers and smart devices is problematic.

To find out if kindergarten pupils interact with the computer and smart device through the e-learning platform and obtain educational content, (65%) of the teachers do not agree that the education platform gives them the complete picture of the extent of the pupils interacting with the platform and obtaining the educational content.

According to the opinion of the female teachers, percentage 62.5%, students can easily access the educational content on the platform, which indicates that the user interface in the platform was well designed.

A teacher's response indicated that pupils could access the platform from any lowercase internet internet-enabled location as soon as it is available, suggesting that it is adaptable (80 %).

The percentages were split into three categories: somewhat necessary (20 %), considerable (35 %), and extremely significant (50 %) in terms of the relevance of female teachers' face-to-face contact with children during this epidemic (42.5 %). This indicates that the interaction of teachers and students with computers and the use of video applications is critical for both parties to complete the educational process in the context of the pandemic. This statement demonstrates the correctness of the statement that (70 %) of teachers have been affected by the pandemic and the suspension of kindergarten education for a while, resulting in the improper raising of students.

Figure 2. shows that female teachers use platforms and media to deliver educational content. What is used the most and relied upon is the WhatsApp application (77.5%), the second application is Zoom by (30%), and some other methods with a small percentage.

Figure 2: female teachers use platforms and media to deliver educational content
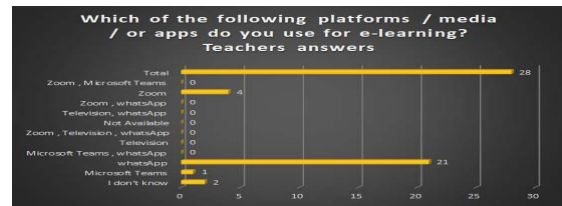
4.3 Kindergarten students:

A percentage of (84.4%) received distance learning, and the means they used in teaching them were as in (See Figure 3).

As described in Figure 3, smartphones are the most used technique, accounting for 70.6 % of all uses, owing to their accessibility to most parents. The remaining percentages are also depicted in figure 3.

figure 3: Technology (media) used for e-learning
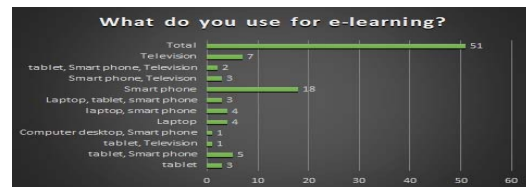
The applications used by students were chosen because they were compatible with the teachers and their students. According to the results, the most popular application was WhatsApp, and the second most popular application was Zoom. (Look at Figure 4).

figure 4: Application used by teachers and students
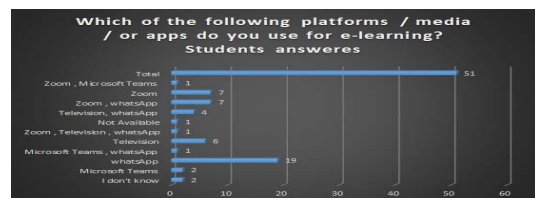
On the question of whether distance learning was enjoyable or not, the responses were mixed, as illustrated in Figure 5.

Figure 5: Do you enjoy e-learning?
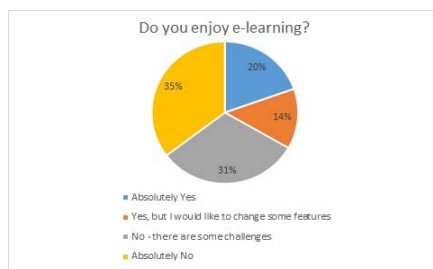
The percentages of students satisfied with the applications and technology utilized in remote learning were likewise unequal. However, discontent was particularly significant among those who were unhappy with the technology (43.1 %).

The replies to a several questions about the e-learning platform were not a good fit for the students.:

The percentages that were not agreed upon in these questions ranged between (55% -75%). Also, the percentages of parents who said they supported their children while they studied online were very close (shown in Figure 6).

Figure 6: Family support studying online.
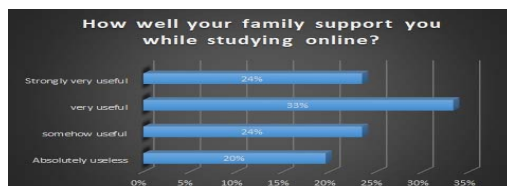
According to the results of the survey, 90% of the children were not learning as much as they were before the pandemic hit.

We arrived at these conclusions after holding a meeting with a group of kindergarten instructors via the Zoom program, during which we asked them a series of questions, which were as follows:

4. Paragraphs and Itemizations

If you would like to itemize some parts of your manuscript, please make use of the specified style "itemize" from the drop-down menu of style categories

In the case that you would like to paragraph your manuscript, please make use of the specified style "paragraph" from the drop-down menu of style categories

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