Chatbot Positive Design to Facilitate Referencing Skills and Improve Digital Well-Being

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Abstract—This article examines the effectiveness of a positive design chatbot in a mobile learning environment on students' referencing skills and digital well-being in a research context. The sample consisted of 150 postgraduate students at King Faisal University Education College who were writing their master's dissertations and facing challenges regarding the preparation of American Psychological Association 7th (APA7) edition-style scientific references. this search used a quasi-experimental study involving an achievement pretest and posttest together with a digital well-being scale to gather data and adopted a positive design for a chatbot to be used in a mobile learning environment. developed a chatbot mobile app called Smart Assistant for Research Referencing according to the proposed model and assessed its effect on skill development and digital well-being. The results showed that posttest knowledge increased significantly, and levels of digital well-being also improved. This study provides a model to help postgraduate students and researchers who use the APA7 style to prepare references faster, more easily, and with high accuracy. Where the research results indicated that there is a problem with students' lack of APA reference skills and their frequent feelings of failure, frustration, anxiety, and lack of motivation, the results of this research may help bridge the gap. Instructional designers may benefit from the proposed positive design model when designing positive learning environments based on artificial intelligence (AI). It can also be applied to professional environments.

Keywords—chatbot, positive design, referencing skills, digital well-being

1   Introduction

References document the sources used in written texts to acknowledge ideas in either quotations or paraphrasing that are not those of the author, and they are vital for avoiding plagiarism and supporting the author's arguments [32],[50]. [38] explained that referencing ensures honesty regarding the origin of ideas since it is immoral for authors to attribute the ideas of others to themselves. [36] confirmed that American Psychological Association (APA)-style referencing is one of the most common problems students face. Repeated mistakes are common during reference preparation, causing great anxiety for students.

Technology can help solve students' problems when preparing references, and levels of plagiarism decrease when students use referencing technology [32], The development of mobile apps for higher education has progressed rapidly [54], and mobile devices are valuable tools for accessing content, supporting learning activities, easily accessing documents, summarizing content, reading books, and sharing information. [46] explained that integrating educational apps into education provides outstanding assistance to teachers and helps students improve their knowledge acquisition [15]. [31] mobile apps are a powerful alternative and more interactive to traditional paper diaries.

According to [2], smartphone-based chatbots have a promising future. They can be used to make learning more interactive and enjoyable for students and to address students' frequently asked questions regarding educational or administrative issues [52]. However, many university teachers believe that the thoughtless incorporation of mobile technologies into classrooms may lead to the neglect of learning goals. [20],[54] agreed that teachers who use mobile devices should pay attention to instructional design to ensure learning strategies that encourage learners to use their devices appropriately for learning activities.

Positive design refers to solutions and innovative ideas that make our lives easier and more comfortable, such as smartphones and tablets [37]. The positive design comprises three basic elements design for pleasure, design for personal importance, and design for virtue [6], that can make our lives easier, safer, and more pleasurable. Well-being promoting design requires increasing activities and experiences with physical tools, not abandoning them [17].

Digital well-being is associated with the personal well-being of individuals because of the prevalence of digital media in our social lives [10]; for example, the consistent use of mobile phones can affect well-being [48]. Digital well-being rests on providing interesting information to users and ensuring the positive impact of technology on their lives [11].

The positive design of mobile apps that integrate chatbots can increase the effectiveness of educational initiatives. A body of relevant literature has shown that using chatbots helps students achieve their educational goals [14],[60]. Most of the studies on chatbots have been conducted in fields other than education, such as medicine [12] or tourism [45], and studies on positive design for digital well-being are rare, usually restricted to medicine [59] and virtual game design [6].

The novelty of the research is that the mobile application provides a state of happiness for students while documenting their references, through the positive design of the chatbot application, which is reflected in students' performance and learning to increase their motivation and achievement, with more optimistic feelings during digital learning.

The remainder of this paper is organized as follows. In Section 2, the literature review. In Section 3,4 we present our work. In Section 5, Experimental results and evaluation are provided. Section 5, the discussion. Finally, we conclude our work in Section 7.

2   Literature review

This section describes the core tools and approaches of our research. We further present a discussion on relevant studies and their shortcomings.

2.1   Research referencing skills

Reporting scientific research depends on integrating the ideas of many scientific authors, but learners often do not recognize the importance of documenting the sources of ideas [32], The APA method of documenting references is the most used in psychology, but [8] reported that students frequently make basic errors in-text citations and reference lists. However, few studies have considered innovative ways to instruct students on the proper use and formatting of APA-style citations and references.

Considering the reasons for learners resorting to plagiarism and not documenting references, [38] conducted a study with university learners and noted that they had great difficulty in preparing citations and references in their academic work due to the many different referencing styles, and [32] claimed that plagiarism occurs because undergraduate learners lack proper referencing skills and do not know how to use resources correctly. [19] claimed that for learners to improve their referencing skills, they must practice extensively in the classroom under the supervision of the teacher, and [13] revealed that students have inadequate referencing skills, and that class time is insufficient to allow teachers to provide effective instruction. [27] showed that referencing problems are not specific to undergraduate students; they also affect graduate students. The results of [40] study showed that learners' use of technology in their academic activities may help to reduce levels of plagiarism.

[38] assessed students' use of the APA referencing method and their ability to master the relevant skills at the College of Education at the University of Zambia by examining 710 papers written by learners. The results indicated that the students studied many different referencing styles but failed to understand them. [36]researched the problem of aligning text citations with the reference list using APA style. The sample included 50 randomly selected papers written by students in different disciplines in which teachers noticed that learners made repeated citation and referencing mistakes. The results indicated an increase in accuracy among students who attended APA-style workshops, and the study recommended providing multiple materials to help learners better prepare their references. [63] conducted a study on reference preparation in APA style to reveal the complexity of students' difficulties, and the results showed improvement in students' results and sense of comfort with the style after developing the relevant skills. [19] attempted to improve students' knowledge and application of APA-style referencing rules based on a study of 40 university students using a YouTube tutorial. The results indicated that the students who watched the video gained more knowledge, corrected more errors, and showed increased motivation. Also, [13] designed a collaborative game to teach students APA 6th edition text citation skills for journal articles. The academic study was conducted on a sample of 90 undergraduates and revealed some improvement.

In short, previous studies agree that there is a problem with students' lack of APA referencing skills and their frequent feelings of failure, frustration, anxiety, and lack of motivation, despite their recognition of the importance of acknowledging sources in their scientific writing. Therefore, there is a need for both designers and teachers to pay attention to the design of useful techniques for developing learners' referencing skills, In the current study, we try to help learners prepare their references in an accurate and fast way while providing a greater sense of motivation, pleasure, and achievement.

2.2 Chatbots in mobile learning environments

Integrating technology in an effective way in education by teachers is a primary goal for the development of education worldwide [56]. despite the negative perspective of online learning, the learning tools used are more flexible, provide more time to finish homework, and provide more convenience [35], [41], [42] Mobile app development helps learners communicate better [61], [23] It provides them with comfort and achieves educational goals, and [34] improves the quality of education, chatbots are artificial intelligence (AI) apps that can be integrated into smartphones as mobile educational apps, providing learners with faster communication with teachers and more enjoyable content. [39] explained that the goal of chatbots is to provide an automated service based on a conversational interface that is integrated into group conversations or shared (like any other contact). Chatbots facilitate conversations through voice or text and interact with users on a specific field or topic, giving intelligent responses in natural language. According to [24] chatbots can be classified according to general topics or specific fields, but the latter type may fail if the users' questions exceed the scope of the field.

Using chatbots in different fields such as history, arts, and literature can help to improve knowledge and skills and make teaching more interesting and engaging through active interaction [47]. it has many advantages, such as easy and quick access to required information, which provides instant support during individual learning, increases students' learning capabilities and achievements, and frees teachers to focus on other tasks, such as tracking student progress and monitoring activities [33]. Chatbots can also be accessed by well-known social media apps without the users having to download a dedicated app [49], allowing many users to be dealt with simultaneously, despite the repetition of topics, without getting bored [1].

However, a chatbot has various shortcomings. They may not provide what users expect from responses or may not answer all users' questions [39], and some users, believing that they are talking to real people, may fear misuse and fraud [40]. However, [1] explained that users' mistrust is due to factors related to the chatbots themselves, such as their ability to respond to users and how well they are designed, which must be considered when designing chatbots for education.

Chatbots have been widely applied in many fields, and their use for various purposes has expanded rapidly. In education, a study conducted by [53] examined the impact of chatbot technology on the student experience in the Indian higher education sector. The technology was shared with 47 students, and the results indicated that the students used the chatbot to solve their educational problems and that anyone, regardless of their level

of education, could use the chatbot technology. A study was conducted by [58] on the use of chatbots to improve the results of students at the National University of Distance Education in Spain. Fifty-one students participated in traditional education based on written paper exercises, and another 52 students participated in education based on interaction with a chatbot. The results showed that the students in the experimental group improved significantly compared to the students in the traditional group. Another study, conducted by [18] on the effect of chatbots on student achievement and their opinions about chatbots in a fifth-grade science course, showed that the chatbots were useful and interesting and that students would like to use them for other courses.

Motivation theory is one of the most important theories supporting the application of chatbots in education. In this context, [33] study aimed to reduce the workload of lecturers by using chatbots. The results indicated the positive role of chatbots. Microlearning in mobile learning environments provides many experiences and practices that develop and enhance learners. Research by [60] studying the effect of a chatbot-based microlearning system on students' learning motivation and performance found that chatbots increased learners' motivation and self-efficacy.

In short, employing chatbot apps via mobile devices is useful in educational processes, but designers and teachers need to pay attention to the design of these apps to ensure that they maximize their benefits and minimize their shortcomings.

2.3   Positive design

The positive design thinking methodology is based on developing the creative process to generate innovative solutions for different circumstances [16]. Positive design is the creation of new designs or advanced redesigns to make life easier and more comfortable and improve subjective well-being by focusing primarily on activities and experiences [17], the general objective of which is to have a lasting impact on people's lives [44]. This is done in the context of encouraging people to experience human prosperity through subjective well-being [6], and it also stimulates feelings of efficiency and happiness via the presentation of different alternatives [59]. Positive design is concerned with the pleasure and effectiveness of using a product and achieving a balance between pleasure and purpose [26]. The positive design focuses on bringing out the best in people through activities that create wellness in everyday life [21].

The primary goal of positive design [6], [11], [17], [59], [16] is to support human flourishing for the good of society, and to be positive, design must fulfill the three basic components of subjective well-being, as follows:

1. Design for fun: Pleasure occurs through something that has a positive impact on the learner. A design can be a direct source of pleasure by increasing purposeful experiences, reducing negative experiences, providing enjoyable activities, and helping users achieve goals, thus increasing their desire to participate in the activities.
2. Design for virtue: This type of design achieves moral virtue by contributing to the development of learners' personalities and giving meaning to their actions and behaviors.

3. Design for personal importance: Tools alone do not make learners happy, but their design may help learners achieve their goals by exploiting the tools, gaining awareness of their achievements, and seeing progress toward a future goal.

Positive design enhances well-being by either having a design in place and supplementing it with activities to increase pleasure [44], [26]or by creating a new design with purpose-built activities. The design should reduce adverse conditions or increase well-being, [6] stated that the main challenge of positive design is to create enjoyable experiences and produce pleasure through participation in creative activities. According to [62], among the basic principles underpinning positive design for well-being are enjoyable experiences that promote the achievement of goals. By focusing on design that supports the production of enjoyable experiences toward specific and meaningful goals, as well as active participation, the positive design focuses on the creative activities and experiences that motivate learners.

Investigating the use of positive design for digital well-being, [59] used positive design ideas to help young children with atopic dermatitis by providing various resources, the results indicated that the use of information sources led to a better understanding of the disease and how to deal with it, thus providing feelings of independence and efficiency. [6] introduced a positive design for gaming across virtual reality apps for music-making, and the results confirmed an active experience in line with all components of the positive design framework.

2.4   Digital well-being

Well-being is generally defined as an individual's positive feelings, such as happiness and satisfaction with life [55], while digital well-being is related to the subjective well-being of individuals based on the digital media available in a social environment [10]. According to [22], the definition of digital well-being is the state of well-being that individual experiences in an environment where digital means of communication are available, and the use of digital media lead to a sense of comfort, safety, and satisfaction. [57] argued that digital well-being is a new concept that addresses the lack of balance we may encounter regarding digital communication.

digital well-being is an experience based on achieving an optimal balance between the benefits and drawbacks of digital communications [7]. [48] asserted that mobile technology is a means to enhance the self-management of well-being. Digital well-being depends on understanding how digital technologies can be used to improve our lives and how they affect our well-being [17]. Digital well-being involves an association between digital media use and well-being [10].

Activities that contribute to skill development stimulate personal growth, which has been shown to have a particularly strong impact on individuals' happiness [26] those who develop as individuals work for the prosperity of society and the future. According to [17], digital well-being has become an important need for both individuals and society [57].

Digital well-being is part of digital competence and may have a profound effect on educational institutions by developing the skills necessary for learners to manage

communication and become part of the education system [22]. If education and the employment of digital media in education are treated as closely related, this greatly benefits learners due to the focus on factors that lead to individuals' sense of well-being. This is essential, especially when developing digital apps to foster the well-being of students, because it leads to improved learning outcomes, such as achievement and motivation [3].

According to [17], [6]. and [10], digital well-being has a set of six behavioral indicators that confirm learners' satisfaction with digital learning environments, summarized as follows:

1. Digital autonomy is the ability of learners to make decisions, resist the pressures of society, and regulate their behavior while interacting with others in digital environments.
2. Environmental expertise involves regulating the surrounding conditions and controlling various activities.
3. Personal growth refers to developing learners' abilities and increasing their efficiency while maintaining their optimistic feelings during digital learning.
4. Positive relationships with others mean forming social relationships based on friendliness, mutual trust, and give and take.
5. Purposeful life in digital environments depends on learners having clear goals that they work to achieve.
6. Self-acceptance and an individual's past life must be investigated in digital learning environments.

Study [48] to investigate the relationship between the positive design of technological devices and the development of digital well-being. The study aimed to make use of mobile phones for the development of well-being by designing a mobile phone application, and the results of the study indicated that using a mobile application promoted self-reflection and reduced symptoms of depression, thus increasing emotional well-being. Figure 1 indicated The combination of positive - design and digital well-being.
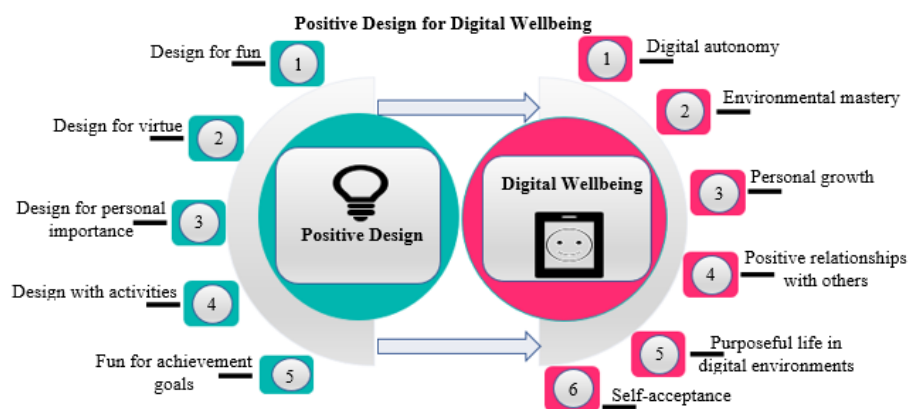

Fig. 1. Positive Design and Digital Wellbeing

The results of a study by [10] indicated that the digitization of society and daily life can undoubtedly affect well-being. Moreover, a study by [1] recommended directing theoretical and applied studies toward examining the stimuli that may lead to an individual's sense of well-being, and [10] highlighted the importance of having a reliable and valid scale, formal models, and strong theory to support digital well-being.

Learners face many educational problems due to a lack of skill, potentially leading to feelings of frustration, anxiety, and lack of motivation. Since smartphones are now available to most learners, there is a need to develop positive design SAFARRY, and despite recent research studying human–machine interactions, [44] there is a lack of research on positive design to provide digital well-being.

3 Research questions and hypotheses

3.1 Questions

1. What is the impact of a positive design chatbot in a mobile learning environment on postgraduates' APA7-style referencing skills?
2. What is the impact of a positive design chatbot in a mobile learning environment on postgraduates' digital well-being?

3.2 Hypotheses

H1: There is no statistically significant difference at the $p \leq .05$ level between the pre-and post-test average scores of an experimental group of students due to a positive design chatbot in a mobile learning environment.

4 Methodology

4.1 Study approach

The present study employed the experimental approach to determine the effectiveness of a positive design chatbot teaching method in a mobile learning environment and its impact on referencing skills and levels of digital well-being among graduate students, the students were randomly selected into one group.

4.2 Participant population

participants in the training workshop were 150 postgraduate students enrolled in the Master of Education, King Faisal University, Kingdom of Saudi Arabia. The students had reached the stage of drafting their scientific theses using the APA7 referencing method during the second semester of the 2021–2022 school year.

4.3   Research design

In setting up the experimental intervention for the research, we applied the ADDIE model of instructional design according to [9], as follows:

Analysis: Determining the general objective of learning: The overall learning objective in this study was to determine the effectiveness of a positive design chatbot in a mobile learning environment on referencing skills and digital well-being among graduate students from the College of Education at King Faisal University.

Determining learners' characteristics: The students had reached the stage of authoring their scientific theses using the APA7 referencing method. They understood the importance of correctly preparing their citations and references according to the APA7 style. They also had smartphones and tablets and knew how to use various mobile apps, but they lacked the skills to prepare scientific references and found this difficult, which made them frustrated and depressed.

Assessing learning needs: We aimed to enhance the students' referencing skills and digital well-being.

Assessing skills: The positive design chatbot for a mobile learning environment had to develop two main skills, each of which included many subskills. We presented a list of skills to arbitrators in the field of educational technology for evaluation and implemented the proposed modifications. The final list of skills was as follows:

- Citations within the text (19 skills) block quotes, multiple authors...etc.
- References in the reference list (14 skills) Citing a book, citing a journal …etc

    Analysis of the technological environment: The technology required for the study:

- Smartphones or tablets with Internet access
- WhatsAuto (an interactive chatbot-building app)
- WhatsApp to support students' interactions with the chatbot
- The ZOOM app to deliver the introductory meeting with the experimental group and the subsequent training course
- The APA website as a reference guide
- The YouTube website and mobile app for students to watch and share educational videos on how to prepare citations and references in APA7 style.

Design: Setting educational objectives: There were two main educational objectives for the referencing skills, correct citation within the text, and correct referencing in the reference list. We presented a list of 33 behavioral learning objectives to a group of 5 educational technology experts to assess the validity and formulation of the objectives. Some modifications were suggested, and after making these modifications, the final version was ready for use.

Figure 2 indicated the design of a positive design chatbot in a mobile learning environment was based on the following steps:

- Design of a chatbot flowchart in which all-possible interactions between the chatbot and students were predicted to develop referencing skills.

- Preparation of the chatbot database based on a file with enough data and information to fit into the chatbot database through the WhatsAuto app, which was then connected to the WhatsApp application to underpin an experimental conversation with a sample of students. We aimed to ensure that the design was fun and would motivate students to achieve their academic goals. Finally, we configured the interactive chat and tested it on the students by encouraging them to interact with the app and urging them to use it for their scientific referencing.
- Positive design is realized through the designed interactions, activities, and meaningful experiences, which aimed to reduce negative experiences through the design and use of the chatbot, taking into account (Design for fun, Design for virtue, and Design for personal importance).

Fig. 2. Positive design chatbot in a mobile learning environment

Development: At this stage, QR codes were sent to the students to enable them to communicate with WhatsApp in a mobile learning environment, providing a platform for interaction between students and the chatbot smart agent connected to a database that included the steps for preparing text citations and references based on our expectations of the students' questions and the specific answers. Students could end their chats with the chatbot at any time. then evaluated the pre-and post-test results of the experimental group of students.

Implementation: A pilot study was conducted on a sample of 10 randomly selected students in the College of Education not involved in the main experiment and had the same characteristics as the main experiment sample. They were one group that received APA-style reference documentation training and was directed to interact with the chatbot through the WhatsApp mobile application.

A pilot study was conducted to confirm the effectiveness of the positive design chatbot in the mobile learning environment for developing referencing skills and digital well-being and to determine the validity and reliability of the study tools. The pilot

study allowed us to identify any difficulties that might arise during the main experiment.

Evaluation: This stage included formative evaluation to ensure the validity of all the previous stages, considering the results of the pilot study. Thus, all the required modifications were applied, and the interventions were made ready for implementation in the study's main experiment. Figure 3 indicated the positive design of chatbot in a mobile learning environment for Digital well-being.
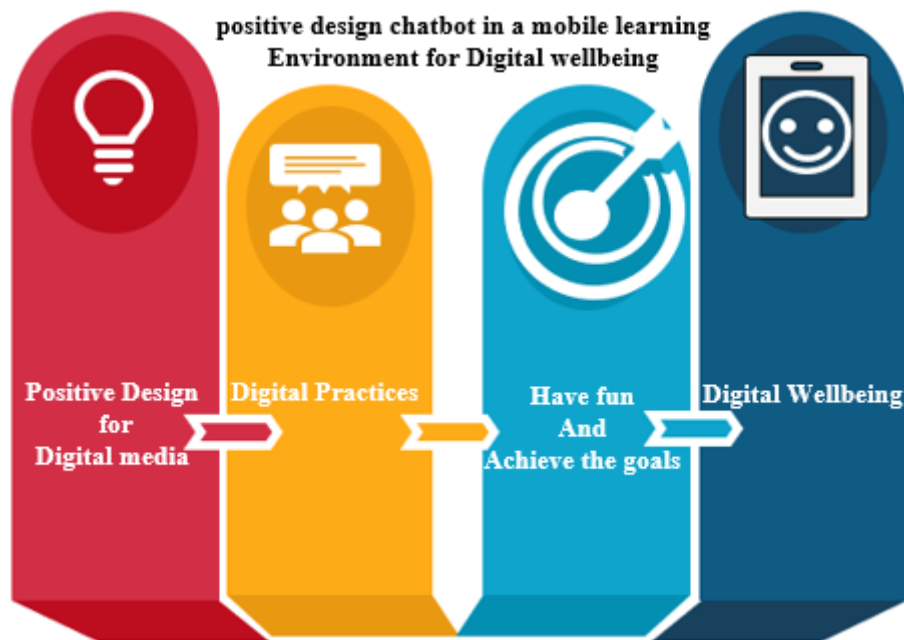

Fig. 3. Positive design chatbot in a mobile learning environment

4.4 Data analysis

Achievement Test: The test aimed to measure the cognitive achievement of APA referencing skills among postgraduate students. The test consisted of 20 multiple-choice questions, each of which was marked as one or zero, and the total marks could range from 0 to 20. it was presented to a group of five arbitrators in the field of educational technology for assessment, and the amendments were made based on their opinions. The test reliability coefficients were calculated using the test and retest method, and Spearman's coefficients were used for the results.

Digital Well-Being Survey: This survey aimed to identify indicators of digital well-being among graduate students at the College of Education, King Faisal University after they used a positive design chatbot in the mobile learning environment to develop their referencing skills. We reviewed some measures of psychological happiness and digital well-being [1],[5],[17] ,[10], [25], [51] and based on interviews with experts, we identified six axes, as follows:

1. **Digital autonomy**: Learners' independence and interactivity in preparing scientific references with the help of an AI chatbot.
2. **Environmental expertise**: Learners' ability to organize their work and prepare references anytime and anywhere in the mobile learning environment.
3. **Personal growth**: Learners' development of skills in preparing scientific references using an enjoyable new technology, which maintained their optimism and happiness during their learning.
4. **Positive relationships with others**: Students' interactions with the smart agent in the SAFARRY, which we designed to be user-friendly and sympathetic to give the students the impression of dealing with a real person.
5. **Purposeful life in digital environments**: Postgraduate students had problems with their lack of referencing skills, which led to feelings of frustration and lack of motivation. However, their interaction with the SAFARRY in mobile learning helped them achieve this difficult goal.
6. **Self-acceptance:** in digital learning environments, despite the difficulties that students faced in referencing before using the SAFARRY, improved after using it.

Table 1 indicated to the digital well-being scale card, which has 6 main themes and 3 statements for each, totaling 18 statements on the scale. Scale scores were assessed on a five-point Likert scale ranging from 5 (completely agree) to 1 (completely disagree) for all statements. A group of experts assessed the validity of the tool and recommended reformulating some items to improve clarity. We made the recommended modifications, and the tool was then ready for use.

The validity of the scale was assessed by calculating the correlation coefficients between the scores of the experimental sample using the Oxford Happiness Questionnaire [25] and the scores on the digital well-being scale, we found that the reliability coefficient of the scale, calculated using the Cronbach's alpha method on the experimental sample, was .77. The reliability of each statement was calculated separately.

Table 1. Digital Wellbeing Scale Card

Scale	completely agree	agree	somewhat agree	disagree	completely disagree
1- Digital autonomy					
1. The application helped me think better when documenting references. 2. The application helped me to rely on myself in documenting references. 3. The application helped me identify the optimal method of documentation.					
2- Environmental mastery					
4. The application enables me to control the documentation of different references (books, scientific research, master's thesis....) 5. Easy-to-use application. 6. I think that the application is a suitable way to document references.					
3- Personal growth					
7. There is a noticeable improvement in my performance in documenting references. 8. I felt the use of time when using the application. 9. The application helped me to raise my efficiency in documenting references.					
4- Positive relationships with others					

10. I trust using the application to document my references.
11. The application answers my questions at the same moment. (Quick answer
12. Can document my references anytime and anywhere using the application.
5- Purposeful life in a digital environment
13. I felt that the application helps me achieve my academic goals.
14. I felt that the application helps me to overcome the problems of documenting references.
15. I can document the references in the text and the list of references using the application.
6- Self-acceptance
16. I am satisfied with myself when I use the application.
17. My confidence in myself and my abilities increases when I use the application.
18. I felt positive when I used the application.
Total

4.5 Procedure

- We applied the research tools in a workshop to 150 postgraduate students at the College of Education, King Faisal University in the Kingdom of Saudi Arabia, with pretest and posttest evaluations.
- We used the WhatsAuto app to build a database for preparing scientific references in APA7 style, which was linked to WhatsApp. We directed the students to access WhatsApp using the professor's phone number or by scanning the QR code to engage with the chatbot database.
- The research experiment took about three weeks, from 16/02/2022 to 09/03/2022.
- The achievement test was presented before and after the experiment. Students completed the digital well-being questionnaire upon completion of the experiment, and then we used data collection tools to analyze the data.
- Using SPSS, we processed and statistically analyzed the data using independent sample t-tests to determine the significance of differences between the pretest and posttest experimental outcomes.

5 Results

Statistical analysis software SPSS 28 was to answer research questions:

5.1 Academic achievement

Q1: What is the impact of a positive design chatbot in a mobile learning environment on postgraduates' APA7-style referencing skills?

to answer the first question, paired samples t-tests were used. The results of the t-test analysis Table 2 showed statistically significant differences at the p = .05 level between the average scores of students in the achievement pre- and posttests (t = 84.956, $p < .05$), with the highest mean value of M = 19.35 (S.D. = .786). Thus, the research hypothesis was rejected. There was a statistically significant difference at the $p \leq .05$ level among the average scores of the experimental group in the pre and posttests due to the use of the positive design chatbot in the mobile learning environment.

Table 2. T-test analysis for pretest-posttest achievement

Pair		Mean	N	Std. Deviation	Std. error Mean	t	DF	Sig
Pair	posttest	19.35	150	.786	.064	84.956	149	.001
	pretest	6.33	150	1.902	.155			

The results can be explained by the positive design chatbot in the educational mobile environment offering new ideas to support learning since the design combined fun and goal achievement in an ethical framework while providing relevant activities and inter-actions anytime and anywhere. It had an impact on developing the graduate students' referencing skills, which helped them accomplish their tasks more successfully and with greater motivation since the students could ask questions about referencing at different times, accurately and without restrictions. Moreover, the positive design of the SAFARRY allowed students to have fun besides achieving their goals. However, more studies are required on positive designs for different technological tools.

5.2 Digital well-being survey

Q2: What is the impact of a positive design chatbot in a mobile learning environment on postgraduates' digital well-being?

to answer the second question, we use a digital well-being survey as a data collection tool for 150 students, Table 3 indicating to digital-wellbeing Scale of the highest, lowest degree, average, and total student degrees. the maximum score on the scale was 90, the minimum score was 18, and the neutral score was 54.

Table 3. Digital Wellbeing Scale (highest degree, lowest degree, average)

Main themes	Number of statements	Highest degree 15	Lowest degree 15	Highest Average	Lowest Average
Digital autonomy	3	14	13	0.444	0.444
Environmental mastery	3	15	12	0.000	0.444
Personal growth	3	14	13	0.000	0.444
Positive relationships with others	3	15	12	0.000	0.444
Purposeful life in digital environments	3	15	14	0.000	0.444
Self-acceptance	3	15	14	0.000	0.444
Total statements	18				
Total degree/90		88	78		
Percentage	100%	79.2%	20%		

The scores for each student were calculated separately, and the values ranged between 78 and 88. Most of the student's responses to the digital well-being scale fell between "agree" and "completely agree," although the scale ranged from 1 to 5, and the average score was between 0.000 and 0.444.

Table 4 indicate the digital well-being scale analyses, indicators were developed to include the 6 main themes (Digital autonomy, Environmental expertise, Personal Growth, Positive relationships with others, Purposeful life in digital environments, and Self-acceptance) and 3 statements for each totaling 18 statements on the scale.

The average, std–deviation, mode, and median for each statement were calculated separately, and the values of average ranged between (5-4.68), std–deviation (0 - .36), median (5-4), and mode (completely agree – agree).

This indicated a high level of digital well-being among the students, despite their frustration, anxiety, and lack of desire to prepare references before the experiment. due to the effectiveness of the positive design chatbot in the mobile learning environment. being an innovative design that helped graduate students develop their referencing skills and improve their digital well-being. The positive design chatbot helped to make the activity enjoyable, enhanced learners' achievement of their academic goals, and increased their desire to participate This agrees with [4]. It also contributed to developing the learners' personalities by allowing them to use their mobile phones to achieve specific goals of personal importance, enhancing their sense of progress toward those goals and directly improving their digital well-being. The results of the current research agree with the results of the reference [30]. Online learning communities should be supported, by developing guidelines and organizing online activities and innovative practices to meet different educational situations. However, the scale is new, and there is a lack of research dealing with this topic, so it requires further study.

Table 4. Digital Wellbeing Scale analysis

N	Mode	Median	Std.	Average	1	2	3	4	5
Digital autonomy									
1	Completely agree	5	.45	4.72	0	0	0	30	120
2	Completely agree	5	.42	4.76	0	0	0	30	120
3	Completely agree	5	0	5	0	0	0	138	12
Environmental mastery									
4	Completely agree	5	.45	4.72	0	0	0	138	12
5	Completely agree	5	0	5	0	0	0	138	12
6	Completely agree	5	0	5	0	0	0	0	150
Personal growth									
7	Completely agree	5	.36	4.84	0	0	0	12	138
8	Completely agree	5	.36	4.84	0	0	0	6	144
9	Completely agree	5	.36	4.84	0	0	0	6	144
Positive relationships with others									
10	Completely agree	5	.46	4.68	0	0	0	12	138
11	Completely agree	4	.49	4.44	0	0	0	12	138
12	Completely agree	5	.36	4.84	0	0	0	18	132
Purposeful life in digital environments									
13	Completely agree	5	.46	4.68	0	0	0	0	150
14	Completely agree	5	.36	4.84	0	0	0	24	126
15	Completely agree	5	.46	4.68	0	0	0	6	144

N	Mode	Median	Std.	Average	1	2	3	4	5
Self-acceptance									
16	Completely agree	5	.46	4.68	0	0	0	30	120
17	Completely agree	5	.40	4.84	0	0	0	0	150
18	Completely agree	5	0	5	0	0	0	0	150
Total = Completely agree		5	.190	4.79					
Reliability coefficient = .77									

6   Discussion

This research demonstrated the impact of a positive design chatbot in a mobile learning environment on postgraduates' APA7-style referencing skills and digital well-being, according to the first result, the use of the chatbot in mobile education, based on WhatsApp as a social media interface for conversation, allowed the students to access the service quickly and easily [28]. It also enabled many users to be dealt with simultaneously, facilitating independence and the freedom to use the chatbot anytime and anywhere, and providing immediate support This agrees with [29]. Individual learning, which increased students' educational capabilities and achievements and provided them with intelligent and accurate responses without boring them, made learning more flexible and fun and helped them achieve their goals.

On the other hand, this research also discovered that the positive design of the SAFARRY helped students build positive relationships with the chatbot's personality, which was presented to the students by one of the college professors. The students felt familiar with the "person" they were talking to, improving their confidence in the correctness of the information provided, but learning became the responsibility of the students, which reflected their increased motivation to learn. The students reported that the app was effective and interesting and wanted to use it for other science courses.

These results are consistent with motivation theory, which asserts that motivation encourages an individual to carry out a particular activity, engage with new experiences, and avoid failure. These results can also be linked to the fact that the activities presented in the positive design of the SAFARRY were consistent with the characteristics of the students. Practical examples of references were given in Arabic and English to provide effective training and enhance expertise in applying the acquired knowledge. Content and practical activities enhanced the students' confidence and ability to learn the content.

Second, All the above-mentioned factors were reflected in the emergence of positive feelings, such as comfort, peace, happiness, and satisfaction, according to the indicators of digital well-being [3], [17],[10], which were represented in the positive design of the mobile SAFARRY (i.e., goal achievement and motivation, which enhanced digital well-being). The results of the current study are consistent with studies indicating the effectiveness of positive design in promoting digital well-being, satisfaction, and effective educational participation [11], [55], but there is a lack of research dealing with this topic, so more studies are required. The results of the research can be generalized to everyone who uses the APA style for documenting references. and who is want using

technology in a new way to produce an enjoyable education experience that would support the achievement of specific goals.

7 Conclusion

This research establishes the importance of using technology in a new way of seeking to produce an educational enjoyable experience that would support the achievement of specific goals, promote learners' active participation and motivation, such as confirm the impact of positive chatbot design in a mobile learning environment on the development of graduate students' referencing skills and digital well-being, and confirm the effectiveness of the proposed design.

Several limitations should be noted in the study. First, there has been minimal research on this topic, more studies should be conducted. Second, the context of this study is limited to chatbot technology.

Further research may consider moving toward the positive design of technological media when designing professional environments. this research is limited to the educational field and postgraduate learners, and the next researcher may consider other respondent populations. Finally, Further research may consider the development of referencing skills in different learning environments such as adaptive environments, and other dependent variables.

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