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Technological solutions to fostering students' moral courage: an augmented reality-based contextual gaming approach

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ABSTRACT

Fostering students' knowledge and courage to face illegal or immoral problems is a critical aim in educational settings. However, it is challenging for students who lack knowledge and social experience to comprehend the sins behind the immoral cases and have the moral courage to deal with those problems. Therefore, in the present study, an approach combining AR with game-based learning (ARGBL) was proposed. Furthermore, a quasi-experimental design was adopted to examine the effectiveness of the approach in terms of developing students' moral courage regarding anti-corruption and their learning satisfaction. The participants were recruited from two classes in a university. One class with 30 students was assigned to be the experimental group who played the developed game for 4 weeks; the other class with 30 students was the control group who learned with the conventional technology-based learning (C-TL) mode (i.e. the teacher gave lectures using slides and multimedia). The results revealed that the experimental group's moral courage and learning satisfaction was significantly higher than those of the control group. The findings of this study provide a reference for those intending to foster students' moral courage when facing other immoral cases.

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Introduction

The abrupt changes resulting from rapid innovation are pressuring everyone to encounter the BANI world, which refers to a 'brittle, anxious, and incomprehensible' situation in which the focus is on material success (de Godoy & Ribas Filho, 2022). Consequently, the competition is intense, and people seek their own personal interests rather than mutual interests with others (Zachosova, 2023). Simultaneously, moral depravity is increasing, and thus, corruption is likely to also become more complex and aggressive (Sharma, 2022). Although corruption in each country is based on various causes and contexts, it is one of the drastic threats that interferes with a nation's development (Song et al., 2021). Many countries implement strategies to prioritize corruption prevention and rectification (Damijan, 2023). In Thailand, corruption is one of the primary issues that considerably obstructs the country's development. This problem has become embedded in almost all of the careers in Thai society that relate to people's way of life (Prateppornnarong, 2021). One partial cause is the lack of moral courage, and Thailand's younger generations are now facing issues involving weak moral courage, particularly with regard to undergraduate students (Sripongplerd, 2021).

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Moral courage is unintuitive but could be developed by a regular program of learning, instruction, and training (Pajakoski et al., 2021). Previous studies illustrate the three primary guidelines for moral courage development for anti-corruption approaches: lectures and discussion, learning about ethical role models, and training, which however, do not correspond with the teenagers' current learning habits, especially those who are studying at the higher educational level (Flom et al., 2023). Young people studying at the higher educational level are considered to be Generation Z (Gen Z); as they have grown up with technology, they are also called 'the digital generation' (Kolikant, 2010). For this reason, technology is significant for Gen Z learners. They express a specific interest in what they want to know or what challenges them, and they do not enjoy lectures (Cickovska, 2020). Therefore, the learning strategies must highlight the challenging activities in which they can actively take part, focus on independent study, and adapt technology for assistance (Castillo et al., 2023). In addition, using games as the instructional medium remains one key to enhancing their skills (Nitisakunwut & Hwang, 2023; Swacha et al., 2023). For example, Hung and Yeh (2023) developed augmented-reality-enhanced game-based learning in flipped English classrooms to promote vocabulary acquisition and creative thinking to undergraduate learners. Likewise, Lam et al. (2023) created augmented-reality-enhanced game-based applications as a tool for learning Biology. However, the programs for the mentioned developed games need to be downloaded from a website onto the device, so the computer or smartphone's capacity is required to store the game's data; otherwise, the game cannot be activated, and the user cannot exchange learning and give feedback or experience the realization of new knowledge.

Augmented reality (AR) stands out as a transformative technology with a significant potential impact on undergraduate education (Arena et al., 2022; Dargan et al., 2023). AR games can allow the learners to play a role and gain direct experience from simulated situations on many types of devices that are connected to the internet. The players interact with other players via chat, voice chat, or photo files, join the community within the game, exchange items, and/or give advice and suggestions (Laato et al., 2021). Moreover, there are a number of mechanisms to encourage the players, including Arousal, Objectives, Incentives, Punishment, and Competition. AR learning through simulations offers a novel method of education, offering tangible experiences and practical learning scenarios mirroring real-life situations. This enhances students' engagement and involvement in the learning process (Wang, 2022).

Nevertheless, previous studies showed that there are limitations to the use of technology for the development of moral courage for anti-corruption awareness. In response to these challenges, the researcher integrated concepts and theories from interdisciplinary perspectives, such as ethics, behavioral science, educational technology, computer science, and learning psychology, in order to develop an AR game to build the moral courage for anti-corruption perspectives in the newer generations. These research results will lead to the acquisition of the augmented reality games to promote moral courage for anti-corruption awareness in new generations because the AR technology combines technology with the real-time reality presented as the graphics in the virtual reality world. This will help the new generations to distinguish courage from cowardice. In addition, the costs required are reasonable, so there are no limitations with regard to access. As a result, the environment will be established for lifelong learning, which is one of guidelines, as well as the media that can rectify corruption issues so as to be inclusively and effectively suitable for the current context. This will provide benefits for interested people to adapt in order to promote moral courage in the new generations against corruption in the future.

Literature review

Moral courage in combating corruption

Being able to follow moral ideals and make the correct decision in the face of recognized threats or difficulties is known as moral courage. Moral courage is necessary for the progressive creation of a more moral environment, but its absence causes even the finest qualities to deteriorate through neglect (Kidder, 2006). It is important to recognize that scholars have provided a variety of definitions for bravery, moral and otherwise, and have sometimes drawn a distinction between various methods for defining and measuring moral courage using empirical data. Researchers have defined moral courage as having the willingness to stick to convictions or ideals even in the face of criticism from others

(Pajakoski et al., 2021). Morally courageous people tend to face the danger of anxiety, social rejection, loneliness, ridicule, and even injury to themselves or their loved ones. Kidder (2006) argues that moral courage is being able to tell between right and wrong, take action at personal cost, and publicly recognize the choice of right over wrong. Sekerka and Bagozzi (2007) explored moral courage as the ability to prioritize the well-being of others ahead of oneself, and to act in alignment with one's inner values. As seen in Figure 1, it involves the junction of three components, namely moral ideals, the ability to bear the costs, and an understanding of the risk.

Moreover, the moral courage to act against corruption is a personal strength that persists in justice and accepts the moral conflict outcomes that threaten, criticize or discourage, and the potential for personal loss in any way. It involves the readiness to advocate for what is morally correct despite facing pressures that might lead one to act differently. It transforms principles into deeds.

Learning satisfaction

The term 'learning satisfaction' describes how students feel and interpret the degree of fulfilment they derive from the learning process. This is affected by past educational experiences as well as their motivation to study. They also stress that people have various learning requirements, concentrate on different things, and, as a result, have varying degrees of fulfilment with their education (Chang & Chang, 2012). Since student fulfilment is seen to be a critical factor in the effectiveness of educational initiatives and has a strong connection with academic achievement, it should be researched. Prior studies on education have proven the importance of student fulfilment when evaluating learning outcomes and the efficacy of online learning programs. The majority of research on satisfaction with an educational experience or context either covers a complicated setting or a broad, general feeling about the process as a whole. Being satisfied with the educational curriculum is one example. Alternatively, they concentrate on individual elements of the overall mindset, including a learner's level of satisfaction with a given set of lessons. According to Zou et al. (2022), there is a relationship between student satisfaction and factors such as the program's expected value, a feeling of fulfilment, and perception of the simplicity of use, as well as flexibility in learning, conditions for success, the rate at which teachers reply, and the program's usefulness.

The combination of AR with game-based learning (ARGBL)

In technology-enhanced learning, the combination of AR with game-based learning (ARGBL) is becoming increasingly important (Lampropoulos et al., 2023). AR-enhanced games, or even AR applications with rules and game components, are useful and productive learning tools (Kamińska et al., 2023). The development of practical and highly engaging visual learning forms has been made possible by educators utilizing the potential of ARGBL, thanks to the maturity and accessibility of AR technology. New evidence suggests that learning information using augmented reality (AR) technology can improve learners' long-term memory, problem-solving ability, and motivation, as well as their excitement and teamwork skills (Alkhabra et al., 2023). It can also boost efficiency in learning, autonomy, and relatedness (Triantafyllou & Sapounidis, 2023). It is possible that ARGBL might permit the development of novel teaching approaches

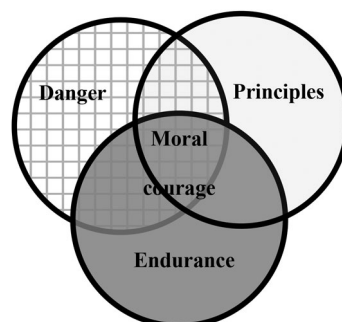


Figure 1. The components of moral courage.

which might bring about significant changes in the learning experience, but at present there have been few applications of ARGBl in the field of moral education. It is therefore necessary for additional research to be carried out, in particular using case studies, in order to learn how ARGBl experiences can be better designed to match the level of the learners across a range of topics. ARGBl can be used to support learning via the use of games, and can also make use of real objects which can enhance the sense of realism and fun among learners. Two key components of ARGBl are motivation and a rich learning experience, which can result in greater enjoyment, the acquisition of knowledge, and improved collaborative activity (Pellas et al., 2019). Furthermore, the learners' cognitive acceleration can be boosted by ARGBl, while greater levels of engagement in activities based upon practice can also improve learning when combined with a genuine desire to make behavioral changes. As part of the learning process, players in a game have the objective of developing particular skill sets, while overcoming challenges in the game will lead to heightened personal satisfaction (Triantafyllou, 2022). Short-term motivation can be derived from the short-term challenges found in games, although it is also necessary to maintain focus on the achievement of long-term aims (Triantafyllou et al., 2023). For example, research by Ali (2020) created a mobile game model that uses augmented reality to increase student engagement with the present framework for moral education. Students develop an understanding of fairness, recognize the traits of unfairness, and understand the adverse impacts of unfair behavior through the interactive augmented reality game. Sari et al. (2021) claimed that providing virtual aspects and encouraging students to participate in decision-making activities can improve moral knowledge of topics that are not obvious to the mind. AR technology is used in the behavior simulations created in this study because of its many benefits. Symbolic models using augmented reality (AR) technology are used in online simulated scenario games, which attempt to copy system properties. The idea that combining AR and GBl as a learning strategy is interesting to investigate is thus supported by the obvious synergy that exists (Ye et al., 2024).

In conclusion, the prior conversation suggests that augmented reality-based online simulation games help young people develop moral courage, which can be seen as a combination of qualities including courage, perseverance, honesty, and vigor in their struggle against wrongdoing.

The aim of the study

This study aimed to investigate how effective an online simulation game is in terms of promoting moral courage against corruption and increasing satisfaction. To achieve this goal, the research sought answers to the following questions.

1. Is there a significant difference in moral courage against corruption between the intervention and control groups?
2. Did students in the intervention group have the highest level of learning satisfaction?

Methodology

This investigation used a pretest-posttest quasi-experimental method to determine how moral courage in combating corruption is impacted by playing augmented reality-based online simulation games. The countering corruption learning approach was applied by the intervention group and control group but with different learning materials. The experimental group used an augmented reality (AR)-based contextual gaming (AR-CG) approach, while the control group received lessons using the conventional technology-based learning (C-TL) approach.

At the beginning of the semester, the research was outlined to the students, and consent was obtained from them during this period. Since the study activities were integrated into student learning, all enrolled students in the modules took part in them. The classroom gaming intervention was administered to the control group following the knowledge posttest. Nevertheless, data including moral courage scores from individuals who did not provide consent for participation in the study were omitted from the data analysis.

Participants

The students, all in their sophomore year, were randomly assigned to two groups: the experimental group ($n = 27$) and the control group ($n = 27$), as determined by the G*Power 3.1 program with a 95% confidence interval, 5% significance level, and 0.92 effect size based on the results of a previous study that verified the effects of augmented reality on education (Lin et al., 2020). However, to account for factors such as potential absenteeism, an extra 10% of the planned sample size was incorporated, resulting in a total of 60 students participating in the study, divided into the experimental group ($n = 30$) and the control group ($n = 30$). The average age of the participants was 20.3 years, ranging from 19 to 21. All students had prior experience with blended learning and were familiar with mobile-assisted learning using smartphones, although only a few had experience of augmented reality (AR)-based contextual gaming (AR-CG). While they had all played various types of games outside of class, none had experienced technology-enhanced game-based learning within a course setting.

Measuring tools

For this study, a self-administered questionnaire was employed to gather data from students enrolled in general education courses. The tools are described in detail as follows.

The moral courage in combating corruption questionnaire

The measurement of moral courage in combating corruption, based on Kidder's Moral Courage model (2006), includes 15-items focusing on three key themes: awareness of danger, commitment to moral principles, and willingness to endure consequences. The questionnaire also inquired about instances where students demonstrated moral courage through their actions. Using a Likert-type scale ranging from 'never true' (1 point) to 'always true' (5 points), the total average value was calculated for subsequent analyses. The internal reliability coefficient was 0.81, indicating adequate reliability (Hajjar, 2018).

The learning satisfaction questionnaire

To explore students' satisfaction with online simulated scenario games that utilize augmented reality technology, we used the questionnaire based on the measures of Lim et al. (2022). Students were asked to respond to 10 items using a 5-point Likert scale ranging from 1 (*very dissatisfied*) to 5 (*very satisfied*). Satisfaction levels were categorized as follows: 1.00 – 1.79 (*very dissatisfied*), 1.80 – 2.59 (*dissatisfied*), 2.60 – 3.39 (*moderate*), 3.40 – 4.19 (*satisfied*), and 4.20 – 5.00 (*very satisfied*). The Cronbach's alpha coefficient was calculated for the entire scale, and indicated good reliability ($\alpha = .79$) (Hajjar, 2018).

Online simulated scenario games utilizing an augmented reality (AR)-based contextual gaming (AR-CG) approach

When designing game scenarios, the problem-solving model proposed by Rest (1986), which focuses solely on morality, was utilized. As a result, four psychological processes need to take place before moral courage in combating corruption can occur: (1) interpreting the situation and generating alternative actions, (2) selecting an alternative based on certain considerations, (3) prioritizing the moral value choice over amoral values and connecting the choice with the value, and (4) intending to act. This AR game consists of 3 stages: Stage 1 - Mountain Climbing Challenge, Stage 2 - Labyrinth Mystery, and Stage 3 - Deciphering the Cheater, as shown in Figures 2 and 3. After players successfully complete each level, they extract the lessons learned and apply them in their daily lives. The game enhances moral courage in combating corruption by selecting the most appropriate action to satisfy needs and desires within a self-directed individual. Players are free to choose from various alternatives, but their choices are constrained by concerns about causing harm to themselves or others or infringing upon their rights.



Figure 2. The game mechanism and interface of the contextual game.

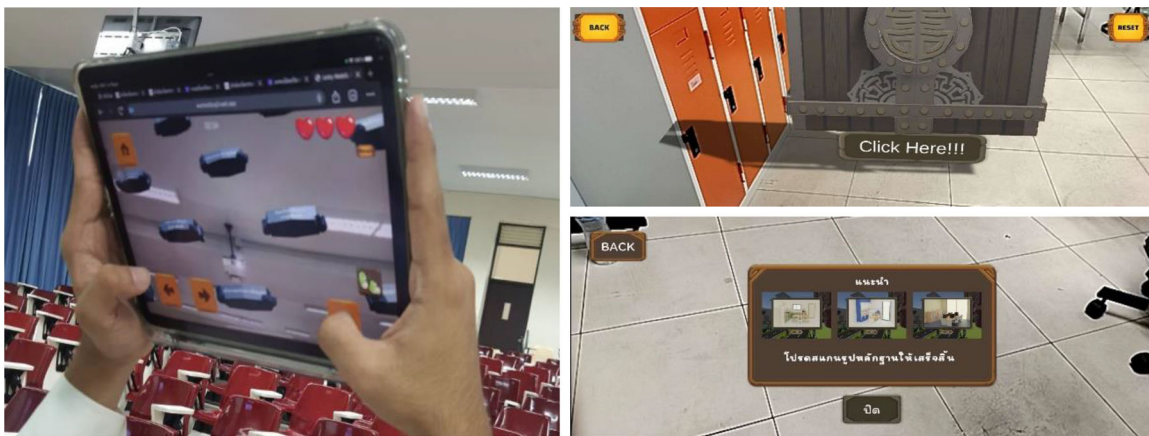


Figure 3. Incident events in the game.

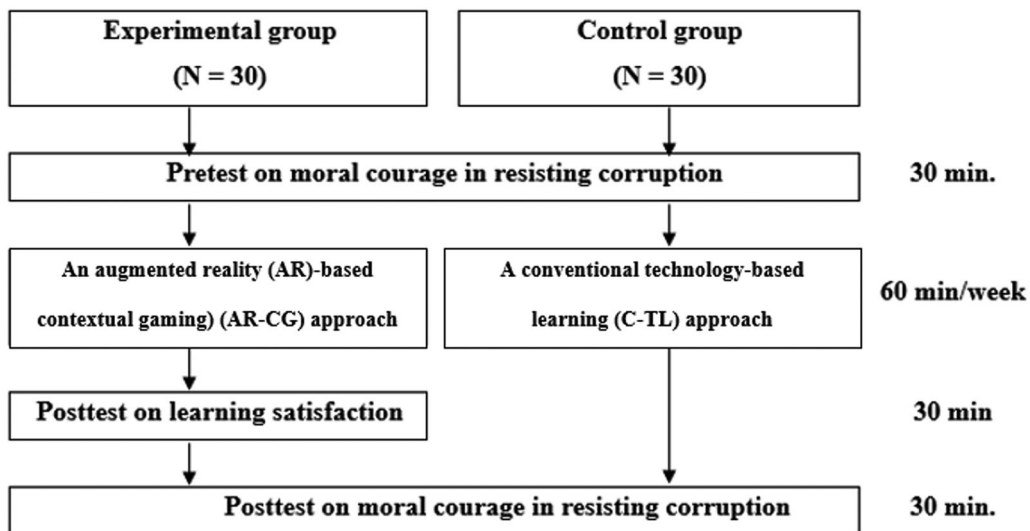


Figure 4. The experimental procedure.

Experimental procedures

As shown in Figure 4, in the first stage, both groups of students learned anti-corruption knowledge and received instructions for operating the AR-based learning game system. Following that, the students took a pretest and completed the pre-questionnaires in 30 minutes.

In the second stage, the students in the experimental group were arranged to learn with the AR-based mobile game about anti-corruption. The activities included multiple AR scenes in which students could see a character in their room through Augmented Reality. This was possible because the app uses the camera on a mobile device to overlay the character onto the real-world environment. Each scenario lasted approximately 60 minutes, varying based on each participant's level. A screenshot from the video of each scenario is provided in the supplementary information section.

In contrast, students in the control group were instructed through conventional learning methods. Additionally, they had access to supplemental materials and received guidance from the system if they answered questions incorrectly. The learning session spanned 60 minutes. Following the session, both groups completed a posttest and were given a post-questionnaire to gauge any potential shifts in their moral courage.

Data analysis

The data collection lasted for one month and then data were analyzed using the SPSS software (version 16, SPSS Inc, Chicago, IL, USA). Descriptive statistics including mean, percentage, and Standard Deviation (S.D.) were used to determine moral courage levels. To analyze the data, MANOVA was used at the significance level of $p < 0.05$.

Result

To compare the online simulation scenario games using augmented reality technology for promoting moral courage to resist corruption core routines for youth in the pre-experimental phase, Multivariate Analysis of Variance (MANOVA) was conducted; the result is as follows: the preliminary agreement test, using Box's M statistic, yielded a value of 9.168, with $F = 1.442$ and $\text{Sig.} = 0.194$. This indicates that the Variance-Covariance Matrices of the experimental and control groups did not differ significantly after the experiment at the 0.05 level of statistical significance. Additionally, Levene's test did not show significant differences at the 0.05 level. When testing the multivariate variance, with the experimental group as the independent variable, Wilks' lambda was found to be 0.960 ($F = .776$, $p > 0.05$), indicating that there was no statistically significant difference in the ethical courage to resist corruption core routines for youth between the experimental and control groups after the experiment at the 0.05 level.

From Table 1, it was found that the experimental group had average scores for ethical courage to resist corruption core routines, including adherence to principles, tolerance for threats, and awareness of dangers or risks, with averages of 16.37, 17.30, and 19.17, respectively. These scores were not significantly different from those of the control group, which had averages of 16.73, 17.47, and 18.93, respectively, at the 0.05 level of statistical significance.

To compare the outcomes of the online simulation scenario game using augmented reality technology for promoting moral courage to resist corruption core routines for youth in the post-experimental phase, Multivariate Analysis of Variance (MANOVA) was conducted. The result is as follows: the preliminary agreement test, using Box's M statistic, yielded a value of 7.55, with $F = 1.19$ and $\text{Sig.} = 0.31$. This indicates that the Variance-Covariance Matrices of the experimental and control groups did not differ significantly after the experiment at the 0.05 level of statistical significance. Additionally, Levene's test did not show significant differences at the 0.05 level. When testing the multivariate variance, with the experimental group as the independent variable, Wilks' lambda was found to be 0.50 ($F = 18.97$, $p < 0.05$), indicating that there was a statistically significant difference in the ethical courage to resist

Table 1. Descriptive data and the MANOVA results for moral courage to resist corruption in the pretest.

Moral courage	Group	N	Mean	S.D	F	Sig
Standing up for principles	Experimental	30	16.37	1.35	1.00	0.32
	Control	30	16.73	1.48		
Endurance of threats	Experimental	30	17.30	1.24	0.28	0.60
	Control	30	17.47	1.22		
Contemplating the risks	Experimental	30	19.17	0.75	1.13	0.29
	Control	30	18.93	0.94		

Table 2. Descriptive data and the MANOVA results for moral courage to resist corruption in the posttest.

Moral courage	Group	N	Mean	S.D	F
Standing up for principles	Experimental	30	20.06	1.11	26.53***
	Control	30	18.33	1.47	
Endurance of threats	Experimental	30	21.63	1.79	19.94***
	Control	30	19.57	1.79	
Contemplating the risks	Experimental	30	21.67	1.83	13.62***
	Control	30	20.13	1.36	

*** $p < 0.001$.

Table 3. Mean and standard deviations of satisfaction with online scenario-based simulation games with augmented reality technology to promote moral courage to resist corruption for youth ($n = 30$).

Items	\bar{x}	S.D	Levels of satisfaction
1. The content of the game is suitable for the level of the learners.	4.50	0.63	Very satisfied
2. The content of the game is easy to understand and is clear.	4.43	0.68	Very satisfied
3. It aligns well with the objectives and covers them comprehensively.	4.40	0.77	Very satisfied
4. The narrated text is clear, interesting, and visually appealing.	4.40	0.68	Very satisfied
5. The appropriateness of the sound effects is satisfactory.	4.50	0.68	Very satisfied
6. The overall appropriateness of colors is satisfactory.	4.60	0.50	Very satisfied
7. Ease of gameplay control.	4.10	0.66	Satisfied
8. Suitability of activities in each game.	4.53	0.63	Very satisfied
9. Appropriateness of image sizes used in the game.	4.60	0.62	Very satisfied
10. Overall satisfaction.	4.50	0.68	Very satisfied

corruption core routines for youth between the experimental and control groups after the experiment at the 0.05 level of statistical significance. The Partial Eta Squared value of 0.55 suggests a medium effect size.

From Table 2, it is found that the experimental group had an average score for moral courage to resist corruption, including adherence to principles, resilience to threats, and awareness of danger or risk, with averages of 20.06, 21.63, and 21.67, respectively, which were higher than the control group with averages of 18.33, 19.57, and 20.13, respectively, with statistical significance at the 0.05 level.

The majority of students were highly satisfied with online simulated scenario games enhanced with virtual reality technology to promote moral courage to resist corruption for youth, with an average rating of 4.50 ± 0.63 , as shown in Table 3.

When considering each aspect, it was found that the highest satisfaction with online scenario-based simulation games with augmented reality technology to promote moral courage to resist corruption for youth was for the following three categories. First, the overall appropriateness of colors and the appropriateness of image sizes used in the game received the highest satisfaction scores, with averages of 4.60 ± 0.50 and 4.60 ± 0.62 , respectively. Following closely is the suitability of activities in each game, with an average score of 4.53 ± 0.63 . Lastly, the content of the games being suitable for the students' level, and the appropriateness of sound effects both received satisfaction scores of 4.50 ± 0.63 and 4.50 ± 0.68 , respectively. On the other hand, the least satisfaction was found for the ease of gameplay control, with an average score of 4.10 ± 0.66 .

Discussion

After examining the effectiveness of online scenario-based simulation games with augmented reality affecting moral courage in terms of anti-corruption concepts for the new generations, it was concluded that AR games can have an influence on moral courage. New generations had an opportunity to be present in challenging simulated situations related to corruption problems, and were encouraged to be aware of the risks, adhere to morality and ethics, and be patient with threats. At that point, they had to decide what to do and how to behave as the AR games simulated the situation related to corruption and presented it via AR technology that combines the virtual world with the real world on the camera. The players could react with the virtual characters, items, and physical environment, which enhanced their learning motivation and participation in the adaptation of moral courage for anti-corruption awareness at any time. This was in line with the study of Hadi et al. (2019), who developed games with AR to promote anti-corruption for learning at the higher educational level, and discovered that the learners

had increasing anti-corruption awareness after playing AR games. Similarly, Chamami et al. (2022) created the instructional media using AR to teach Islam in order to foster anti-corruption concepts, and found that the learners' anti-corruption perspectives increased.

Moreover, students who had undergone instruction in the augmented reality (AR)-based contextual gaming (AR-CG) approach expressed a high level of satisfaction. The utilization of AR technology by learners captured their attention during the learning process and enhanced their enjoyment of and motivation in the learning sessions (Abdullah et al., 2022). Motivation to learn has a strong positive impact on satisfaction with the learning process (Chow & Yeh, 2022). This observation is consistent with findings from Chen's (2020) investigation into the impact of this approach on English as a Foreign Language (EFL) learning outcomes. Chen's study revealed significant enhancements in students' academic performance, motivation, and satisfaction with EFL learning compared to those utilizing traditional video-based methods. Additionally, Wang (2022) found that Augmented Reality Game-based Science Learning outperformed game-based and book-based approaches in terms of student interaction, performance, and satisfaction with the learning process. Through semi-structured interviews, students exhibited a strong affinity for augmented reality (AR) technology due to its practicality, realism, curiosity, and engagement.

Although the online scenario-based simulation games with augmented reality were effective in terms of promoting students' moral courage related to anti-corruption, there are still some limitations to this study. Initially, within the learning session, we faced technological constraints with wireless connectivity, resulting in the inability to display pertinent AR videos on the screen. To broaden the scope of such methods to other uses, future iterations must integrate technological improvements to boost overall satisfaction and adoption. Second, the multimedia resources offered by both systems solely focused on three scenario-based simulation games, and thus lacked comprehensive coverage of the learning content. To extrapolate these study results to a course encompassing a full spectrum of multimedia learning material, additional research is warranted to authenticate the efficacy of AR-based learning methodologies. Finally, the level of enthusiasm linked with the timing and setting where the questionnaires were used to collect data is one of the limitations of this research since it may have affected the concentration of learners while answering the questionnaire. Furthermore, the online moral game itself is unique and may be valuable to future researchers interested in getting a better understanding of AR learning challenges. For instance, the results failed to show whether or not children's experiences with game-based online learning had a beneficial effect on their moral determination when it involved opposing corruption. Therefore, significantly more research is needed to compare the learning outcomes of moral courage in combating corruption across in-person classroom settings and online educational games, particularly when using the 'To do or not to do' approach.

Conclusion

In conclusion, the experimental results indicated that online scenario-based simulation games with augmented reality significantly boosted the moral courage of experimental students regarding anti-corruption. Moreover, the results demonstrated that an AR-based gaming system has the capacity to improve students' satisfaction with intervention materials. This study provides substantial benefit by developing an AR-based gaming system to enhance mobile learning activities in real-world situations while testing its efficacy through testing. Aside from its effectiveness, another important addition is the ability to adapt to various domains, which enables the substitution of gaming objectives and additional content without damaging the recreational value of the game. A three-step learning design approach is advised for researchers and educators who want to incorporate competitive gaming into AR-based field activities. First, choose activities that promote real-world investigation or discovery. In addition, a series of problems relevant to real-world scenarios should be developed for the competitive nature of the game. Finally, the setting and subject matter for each AR-based event must be selected.

Moreover, the outcomes of the research indicated that participants enjoyed playing this morality-challenging online game, suggesting that attitudes should be fostered at home as well as at school. Further, (1) decision-makers should think about integrating augmented reality simulation games online into classrooms so that students, as well as educators, can take advantage of e-services, (2) educators and school

administrators can place more importance on instilling the moral courage required to battle corruption by offering a range of online simulation scenario games and interactive lessons to enhance the learning process, and (3) education-related specialists, such as the developers of e-learning websites, could provide a range of digital platforms to draw interest from more students.

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Disclosure statement

No potential conflict of interest was reported by the author(s).

Ethical approval

The current study received approval from the Ethics Committee of Srinakharinwirot University under the code of ethics (SWUEC-003/2566E). Participants provided written informed consent before taking part in the study. They were also fully informed about the research aims and procedures and were given the option to withdraw at any point. All students completed and signed the informed consent form.

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