Using Online Case-Based Instruction Strategies to Prepare Preservice Teachers for Classroom Management

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Many preservice teachers often find classroom management theories and concepts too abstract to effectively address the specific challenges they encounter in real classrooms. To bridge this gap, educators commonly employ case-based instructional techniques to immerse preservice teachers in the contextual complexities of classroom management. This study investigates and compares the effectiveness of two distinct case-based teaching approaches: face-to-face discussions and a gamified online case-solving platform. Our findings reveal that the group utilizing the gamified online case-solving platform outperformed their peers in pre- and post-assessments, as well as in student perception surveys. This research meticulously examines, evaluates, and discusses the potential positive implications of adopting this innovative teaching method.

Keywords: preservice teachers; classroom management; online case-based instruction; face-to-face teaching.

Introduction

Effective classroom management involves setting up and conducting a class to promote learning, on-task behavior, and overall quality of life (Cohen & Martin, 2023; Kayhan, 2022). Research findings continuously have shown that one of the keys to success in teaching is the teacher's ability to manage the classroom and organize instruction (Brophy, 1988; Cakmak, 2008; Emmer et al., 2000; Johler et al., 2022; O'Neill & Stephenson, 2014; Sanetti et al., 2013). Unfortunately, over one-third of new teachers leave the profession by the end of their third year of teaching, and many of these teachers report that classroom management is the most significant factor influencing their decision (Bushaw & Gallup, 2008; Hattie, 2009; Jones, 2006; Jones & Jones, 2010). The remaining active teachers report that poor classroom management skills (82%) and disruptive students (57%) are still the most significant barriers to their professional success (Domitrovich et al., 2010; Fideler & Haskelhorn, 1999; Long et al., 2019). Teachers also express concern about classroom management procedures and ask for more support and clear expectations (Cooper et al., 2018; Mireles-Rios et al., 2019; Shank & Santiague, 2022). Even though most of these teachers are trained in traditional teacher education programs that state and national accreditation agencies approve, they feel that they are still underprepared in classroom and behavior management (Ganser, 1999; Gee, 2001; Halford, 1998; Houston & Williamson, 1993; Jacques, 2000; Ladd, 2000; Pigge & Marso, 1997; Recard & Nathania, 202; Smith, 2000; Solomon et al., 2012; Tahir et al., 2019; Veenman, 1984).

Teacher education programs face the critical challenge of helping future teachers get beyond a narrowly defined view of classroom management, which often means focusing on managing children's behavior (Ayers, 2001; Carter & Van Norman, 2010; Doyle, 1986). These programs usually target preparing their candidates in research-based classroom management

strategies, beginning with the foundational courses and continuing to their culminating experience as student teachers (Anwar et al., 2022; Grebner et al., 2010). Literature suggests that both aspects of classroom management preparation -coursework and practice deserve careful institutional attention (Jones & Jones, 2010; McCormack, 2001). In any case, programs should not rely on coursework or clinical practice alone to prepare teacher candidates in classroom management (Ladd, 2000; Savage & Savage, 2009). Lack of effective strategies, inadequate preparedness for behavioral problems, and minimal evidence-based classroom management training were all noted as major concerns (Shank & Santiagua, 2022).

Many preservice teachers report that classroom management theories and concepts they learn in their coursework are usually too abstract to address specific classroom management problems they encounter in their field classrooms (Delwiche, 2006; Kretlow & Bartholomew, 2010). In fact, within a limited classroom environment where teacher education programs often provide students with didactic lectures, it is usually the case that some students need to be more engaged in reflective thinking and deepening their understanding of the topics taught (Lewis et al., 2011). Consequently, it is suspected that some of the knowledge acquired in the lecture-based college class cannot be spontaneously utilized in real-world problem-solving situations. Thus, the literature suggests that beyond the traditional textbooks, classroom management instruction during the coursework should focus on identifying, designing, and utilizing learning resources that can enhance students' classroom management problem-solving abilities that can easily be integrated into the existing framework of the lecture-oriented classroom. (Delwiche, 2006; Kretlow & Bartholomew, 2010; Lewis et al., 2011).

Using Cases/ Scenarios to Teach Classroom Management

A “case or scenario” is a problematic situation a teacher faces that calls for some decision or action on the teacher’s part. A case is a realistic example, a true story, or a real-world example (González-González et al., 2014; Gravett et al., 2017; Ulvik et al., 2022; Walther, 2016). The case is intended to draw students into engagement with situations, problems, and roles representative of those faced in "real life" classrooms. Greenwood and Fillmer (1999) describe cases as a middle step between coursework and actual teaching via ill-structured cases. Using cases or scenarios is one of the approaches practiced in teacher education programs to connect theory and practice, especially in classroom management (Herrington & Oliver, 2000; Jong et al., 2006; Lewis et al., 2012). In their 2022 research, Ulvik et al. aimed to help the students to describe how they would choose to respond in a specific situation, as well as to provide theory-based reasons for their choices and discuss potential alternatives.

Some classroom situations might be relatively straightforward (i.e., after children finish free play time, they must clean up for the next activity). Such situations could be well-defined problems to which clear goals and general rules can be applied for problem-solving (Butler et al., 2006). However, many other issues related to managing the classroom involve uncertainties about problem definitions (i.e., what happened and how did it happen here), conflicting perspectives among different stakeholders (i.e., a child says one thing while his or her peer says another thing about what happened between them), and the need for multiple solutions and multiple criteria for solution evaluation (i.e., let’s try this if this doesn’t work, let’s sit down to think about what is a better way of working together). These are the general features of ill-structured problems (Shin et al., 2003; Smith et al., 2011; Skeriene & Juceviciene, 2020). Unlike well-structured problems, how ill-structured problems are dealt with is greatly influenced by

problem solvers' opinions or beliefs about problem situations (Hester & MacG, 2017; Meacham & Emont, 1989; Saleem et al., 2020). While empirical studies in this area are still limited, problem-solving researchers have identified several essential factors influencing the general performance of solving ill-structured problems. Those factors include epistemological beliefs respecting multiple perspectives (Harrington et al., 1996), justification/ argumentation skills reconciling conflicting interpretations and solutions, metacognition -planning and monitoring solutions and processes (Shin et al., 2003), and domain-knowledge (Chi et al., 1982).

The case-based approach is an effective teaching method across multiple disciplines, such as law, medicine, and business (Kaur et al., 2020; Kim et al., 2006; Rippin et al., 2002; Suico, 2021). Recently, teacher educators have used case-based instruction more with pre-service (Hemphill et al., 2015), beginning, and even experienced teachers (Mostert, 2007; Ulvik et al., 2022).

Cases involve real-world situations and consider the perspectives of various stakeholders, including teachers, school leaders, parents, students, and other community members. Through case-based discussion, students enhance their critical thinking, decision-making, analytical thinking, and problem-solving skills (Diamantes & Ovington, 2003; Elksnin, 1998, 2001; Hunt, 2009; Kolodner & Simpson, 1989; Pindiprolu et al., 2003; Saleem et al., 2021; Zottmann et al., 2012). In addition, Merseth (1990, 1991) suggests that while the use of case or scenario in teaching usually brings greater student interest, interactivity, and increased reflection, there are practical problems with this strategy, such as unfamiliarity with the methodology, problems with written expression, time and class size, physical setting for the discussion, the teaching style of the case leader, and case preparation and complexity.

Gamification of Education

While incentivizing people has existed for some time, “gamification” has recently entered the mainstream vocabulary (Iqbal et al., 2021; Kavrayici, 2021; Oliveira et al., 2023; Seaborn & Fels, 2015). Unlike “game-based learning,” which relates to the use of games to enhance the learning experience, “gamification” is a developing instructional approach for increasing learners’ motivation and engagement by incorporating game design elements in educational environments (Hanus & Fox, 2015). To put it differently, gamification is the application of game mechanics to a non-game environment to influence human behavior to foster motivation, behavioral changes, friendly competition, and collaboration in educational contexts (Deterding et al., 2011; Erdem & Erdem, 2021; Lee & Hammer, 2011; Sarkar & Kundu, 2021). Gamification techniques leverage people's natural desires for competition, achievement, status, self-expression, altruism, and closure because gamification transforms the learning experience into an educational game using achievement badges, leaderboards, point systems, level progressions, and quests. These game elements are integrated to help learners achieve their learning goals and objectives (Adhikari, 2021; Bunchball, 2010; Hanus & Fox, 2015).

For students, gamification minimizes negative emotions that they usually encounter in traditional forms of education. It lets them approach knowledge and skills using the learn-by-failure technique popular in game-like environments without the embarrassment factor that generally forms a part of classroom education. Researchers warn practitioners that while gamification can be an effective way of teaching, it is more than simply integrating some game elements into a learning activity (points, badges, etc.) to enhance student learning activities. Therefore, it should be planned and executed very carefully. Huang and Soman (2013) provide a

five-step process that can increase the probability of creating an effective education gamification strategy (Table 1).

Table 1

Five-Step Process to Gamification

Steps	Definition
Understanding the target audience and context	Who is the target audience (age, learning abilities, current skill-set, etc.), and what context surrounds the education program?
Defining learning objectives	What does the instructor want the student to accomplish by completing the education program?
Structuring the experience	How can the learning program be broken down, and what are the Stages and milestones?
Identifying resources	What are the resources needed for gamification (tracking mechanism, currency, levels, rules, feedback)
Applying gamification elements	What gamification elements should be applied (points, achievement badges, levels, leaderboards, etc.?

Theoretical Framework

The Social Cognitive Theory, proposed by Albert Bandura (1986), provides a comprehensive framework for understanding how individuals learn and adapt their behavior based on observations, interactions, and experiences in social contexts. This theory emphasizes the importance of observational learning, self-regulation, and self-efficacy beliefs (Bandura, 1986, 1989). It also expands upon the concept of social learning by incorporating the influence of cognitive processes, such as perceptions, judgments, and motivations, on an individual's behavior and the environment that shapes their actions. Rather than simply absorbing information from their surroundings, social cognitive theory posits that individuals actively shape their learning by interpreting the results of their actions (Bandura, 1989, 1998). This active engagement, in turn, profoundly impacts their surroundings and personal attributes, leading to the formation and modification of subsequent behaviors (Bandura, 2003; Green & Piel, 2009;

Shuell, 1986). The Social Cognitive Theory is particularly relevant to this study on the effectiveness of two distinct case-based teaching approaches in preservice teacher education.

Observational Learning: In the context of this study, observational learning suggests that preservice teachers can acquire effective classroom management strategies by observing and analyzing real-world situations and scenarios (Bandura 2003; Green & Piel, 2009; LaMort, 2019;). The two teaching approaches (face-to-face discussions and a gamified online case-solving platform) can serve as vehicles for exposing preservice teachers to various classroom management challenges, enabling them to observe and learn from these scenarios.

Self-Regulation: Social Cognitive Theory highlights the importance of self-regulation, which involves setting goals, monitoring progress, and adjusting strategies to achieve desired outcomes (Bandura, 1998; Betz, 2007). The gamified online case-solving platform can promote self-regulation by providing preservice teachers with opportunities to independently navigate and solve classroom management challenges while receiving feedback and guidance.

Self-Efficacy Belief: Self-efficacy refers to an individual's belief in their ability to perform a specific task or achieve a certain outcome (Bandura, 1998; Betz, 2007; Mark et al., 2011; Mccormick & Martinko, 2004). In this study, the theoretical framework of Social Cognitive Theory suggests that exposure to real classroom scenarios and active engagement with case studies through both teaching approaches can influence preservice teachers' self-efficacy beliefs in their ability to manage classrooms effectively.

Social Cognitive Theory is a fitting theoretical framework for this study as it aligns with the core objectives of the research. It addresses how individuals acquire and apply knowledge and skills through social interactions and experiences, which is precisely what this study aims to investigate (Bandura, 1998; Betz, 2007; Mark et al., 2011). By analyzing the effectiveness of

different teaching methods in shaping preservice teachers' classroom management abilities, the study is essentially exploring the applicability of Social Cognitive Theory in the field of teacher education.

In conclusion, the adoption of Social Cognitive Theory as the theoretical framework provides a solid foundation for understanding the learning processes involved in classroom management among preservice teachers. It supports the study's focus on observational learning, self-regulation, and self-efficacy beliefs, which are critical components in the development of effective classroom management skills. This framework enhances the conceptual underpinning of the current research and helps justify the choice of this study's methods and objectives.

Project Background

This research project aimed to investigate and compare the effectiveness of adopting case-based teaching methods in a classroom management course face-to-face (in the classroom) and online (using gamified online case-study tools). EDG4444 Instructional Design and Classroom Management course taught at a midsize southeastern university was the site of this investigation. The course was designed for preservice elementary education program students to help explore current knowledge of best practices of various teaching and management strategies and methods deemed appropriate for diverse elementary school settings.

For many years, one of the significant learning activities integrated into this course has been the “classroom management” cases. This activity aims to help students learn about real-world classroom management problems, interact with classroom management and behavior issues, and discuss possible solutions and outcomes. The learning outcomes of this activity are correlated in the program matrix with the state certification examination competencies (Florida Teacher Certification Examination [FTCE] - Professional Education Test). This learning activity

is created and embedded into this course to help preservice teachers master their classroom management competencies listed on state certification tests. The classroom management competencies listed in this examination are selected by the committee of Florida educators, reviewed, and validated by another committee of Florida educators.

During the last three weeks of the semester, the course instructor brings twenty different classroom management cases/scenarios to discuss possible solutions. The twenty cases for this activity are carefully selected so that they are correlated with the FTCE Professional Examination competencies. They represent classroom management course topics such as classroom organization, classroom rules, and procedures, planning and managing student homework, planning and managing the first days of school, designing and managing cooperative learning, encouraging and maintaining appropriate behavior in the classroom, dealing with problem behaviors or misbehaviors, communication strategies for teachers, etc. These cases are articulated as dilemmas to prompt as many varied responses as possible. Also, all the cases are written in first-person language to give the impression that the characters described in the cases are asking for help. The cases are provided to students (preservice teachers) as hard copies in class. During the activity, students develop a case summary and prepare an individual response to each case. Then students work as a group to develop a consensus response for each case. The instructor then presents each case on-screen and invites students to discuss possible solutions.

Student feedback over the years has always been optimistic about the “case-based learning activity” integrated into the course because it (1) allows students to explore different perspectives on cases, (2) helps students assume a sense of ownership of their learning, (3) allows students to explore classroom cases more deeply than simply reading about it or listening to a lecture about the topic, (4) forces active participation rather than listening to a lecture and (5)

improves student motivation (Cohen & Martin, 2023). On the other hand, the three weeks of face-to-face implementation of the case-based learning activity also has brought several issues. For example, students were so excited to discuss classroom management cases that in addition to twenty instructor-prepared cases, there were always students trying to bring and discuss other classroom management cases or issues. Managing time to discuss other classroom management cases was very difficult, requiring instructors to extend the class time each week. As in every face-to-face classroom discussion activity, some dominant students and students felt intimidated or unmotivated to speak. Case activity in the face-to-face implementation did not allow equal time or participation for each student.

Another area for improvement was the non-anonymity. The classroom discussion of the cases usually resulted in students presenting routine, conformist, culturally sensitive responses, taking the safe path due to non-anonymity. Students felt uncomfortable presenting unique and provocative responses or passionate pursuits not to make “a mistake” or say “something wrong.”

The researchers sought possible solutions to increase the effectiveness of the “classroom management cases” learning activity and eliminate the above-mentioned issues. Current literature indicates that “online discussion forums” are the most commonly used learning environments for case-based teaching in face-to-face and online courses (Gao et al., 2013; Hewitt, 2003; Purwanti & Vania, 2021; Wallace et al., 2019; Yeong, 2021). However, several significant limitations are identified by researchers who adopted discussion forums for case-based teaching methodology. For example, Hewitt (2003) complained about excessive student focus on new cases, indicating that students rarely visited online cases that were posted earlier and already received multiple responses.

Students believed they would have little to contribute because the case had received many responses. Medler and Magerko (2011) found out that when discussion forums are used for case-based learning, it is widespread for students to go off-topic within a particular case if the case is not moderated timely and effectively. They suggested that constant moderation is an essential but challenging part of this teaching method. Gao et al. (2013) explained that in a discussion forum environment, some students tend to too readily agree with others or paraphrase others' contributions rather than bring unique possible solutions for cases. This made it very difficult to assess the value of the messages posted for cases. Other researchers criticize the fact that it was challenging to identify messages under each case as a "possible solution to the case" or "a comment to a posted solution" (Hakaya et al., 2021; Oratmangun, 2021; Shireen et al., 2020). The inability of students to freely express their ideas and views on discussion forums because of the lack of anonymous postings was another limitation of using discussion forums for case-based teaching (Paramita et al., 2023). Reischer et al. (2017) stated that without gamification functions added to online discussion forums, student motivation and participation will tend to be low.

Gamified Online Case Study Tool

Considering the limitations of using online discussion forums for case-based learning, the researchers of the current study created a web-based gamified online case-based learning environment from scratch. This project was completed to serve as an effective case-based learning environment without the limitations of ordinary discussion forums. The project's design (website coding and interface design) took two weeks, and another week was spent testing the application. The project was published at https://www.teacherserver.com/case-studies/

Project Structure

This new project was structured differently, unlike the structure of discussion forums (questions on top with threaded comments). The case narrative is on the top for each case, and students can post a unique possible solution. Also, each solution had a section for student comments and discussions. Therefore, the cases, potential solutions, and comments were marked. Prompts were provided to help students post their solutions and comments.

Evaluating/ Voting Each Solution

The solution posted under each case is also available for evaluation by other users. A standardized rubric is used for a practical evaluation rather than marking solutions simply as "good or bad." The evaluation rubric contained various criteria such as the suggested solution "is original," "is relevant to the case," "is respectful of the individual (student)," "is reasonable (easy) for the teacher to implement," is likely to solve the problem." This type of evaluation assigned an average score for each solution posted by users and placed the highest-scored solutions automatically on top with a rating algorithm.

Gamification Elements

The online case study platform aimed to enhance user engagement and encourage specific user actions by implementing gamification through a point-earning system.

- **Define Objectives:** The researchers began by clearly defining their objectives, focusing on increasing user engagement, fostering participation, and cultivating a vibrant online learning community. The primary objective for the platform was to create an interactive and engaging learning environment for users while promoting active participation, knowledge sharing, and a sense of accomplishment.

- **Identify Desired User Actions:** The key user actions the researchers aimed to encourage included reading case studies, posting solutions, participating in discussions of the solutions, and providing feedback.
- **Create a Point System:** A point system was developed, assigning point values to each desired action. For example, within the point-earning system, platform users have the opportunity to accumulate points by engaging in various activities on our platform. Posting a valid solution to a case study grants them 5 points, while evaluating a solution or leaving a comment for an answer each earns them 1 point. Users are also awarded 1 point daily for simply logging into the website. Additionally, for every positive evaluation received on their own solutions, users receive 1 point per evaluation. These point values are thoughtfully designed to incentivize and reward user engagement, fostering a more interactive and participatory experience on the platform.
- **Visual Representation:** To make the point-earning system more engaging, the researchers incorporated visual elements, including user profiles displaying points, progress bars, and digital badges to showcase achievements.
- **Feedback and Rewards:** Immediate feedback was provided to users upon earning points, with congratulatory pop-ups and notifications. The researchers also offered rewards such as certificates, access to premium content, and badges for specific milestones.
- **Leaderboards:** A leaderboard was introduced to recognize the top-performing users, creating a competitive spirit and motivating others to earn more points and climb the ranks.

- **Challenges and Quests:** Users were presented with periodic challenges and quests, encouraging them to complete specific tasks within a set timeframe, earning bonus points and recognition for their efforts. These challenges urged them to complete specific tasks, such as analyzing complex case studies and submitting comprehensive solutions, all within a designated timeframe. Successfully completing these challenges not only earned users bonus points but also garnered them recognition as 'Case Study Masters,' a prestigious title awarded to those who demonstrated exceptional analytical and problem-solving skills.
- **Community Engagement:** Users could view each other's points and achievements, stimulating healthy competition and fostering a sense of belonging to a vibrant learning community.
- **Feedback Mechanism:** Regular user feedback was collected to fine-tune the gamification system continually. This allowed the researchers to adapt point values and rewards based on user motivation and preferences.
- **Avoid Over-Gamification:** - The researchers were mindful not to overwhelm users with excessive game elements, ensuring that the gamification system complemented the platform's primary educational purpose.
- **Test and Optimize:** - Regular data analysis enabled the researchers to gauge the system's effectiveness. Adjustments to point values, rewards, and game mechanics were made to enhance user engagement.
- **Promote Transparency:** - The researchers maintained transparency by clearly communicating the rules and mechanics of the point-earning system, helping users understand how to participate and what rewards to expect.

- **Legal Considerations:** - The researchers ensured compliance with relevant legal and regulatory considerations, guaranteeing that the gamification system adhered to all applicable laws and regulations.

By systematically implementing gamification through a point-earning system, the online case study platform successfully increased user engagement, encouraged participation and created a thriving learning community. This approach not only motivated users but also enhanced the overall educational experience on the platform.

Anonymity

For each message (case, solution, comment), users could select whether to be anonymous by taking up a username assigned by the website or using their names. Students still maintain their scores, badges, etc., under their accounts even if they post some messages anonymously. Researchers in this study attempted to investigate and compare the effectiveness of adopting a case-based teaching strategy via face-to-face versus gamified online case tools.

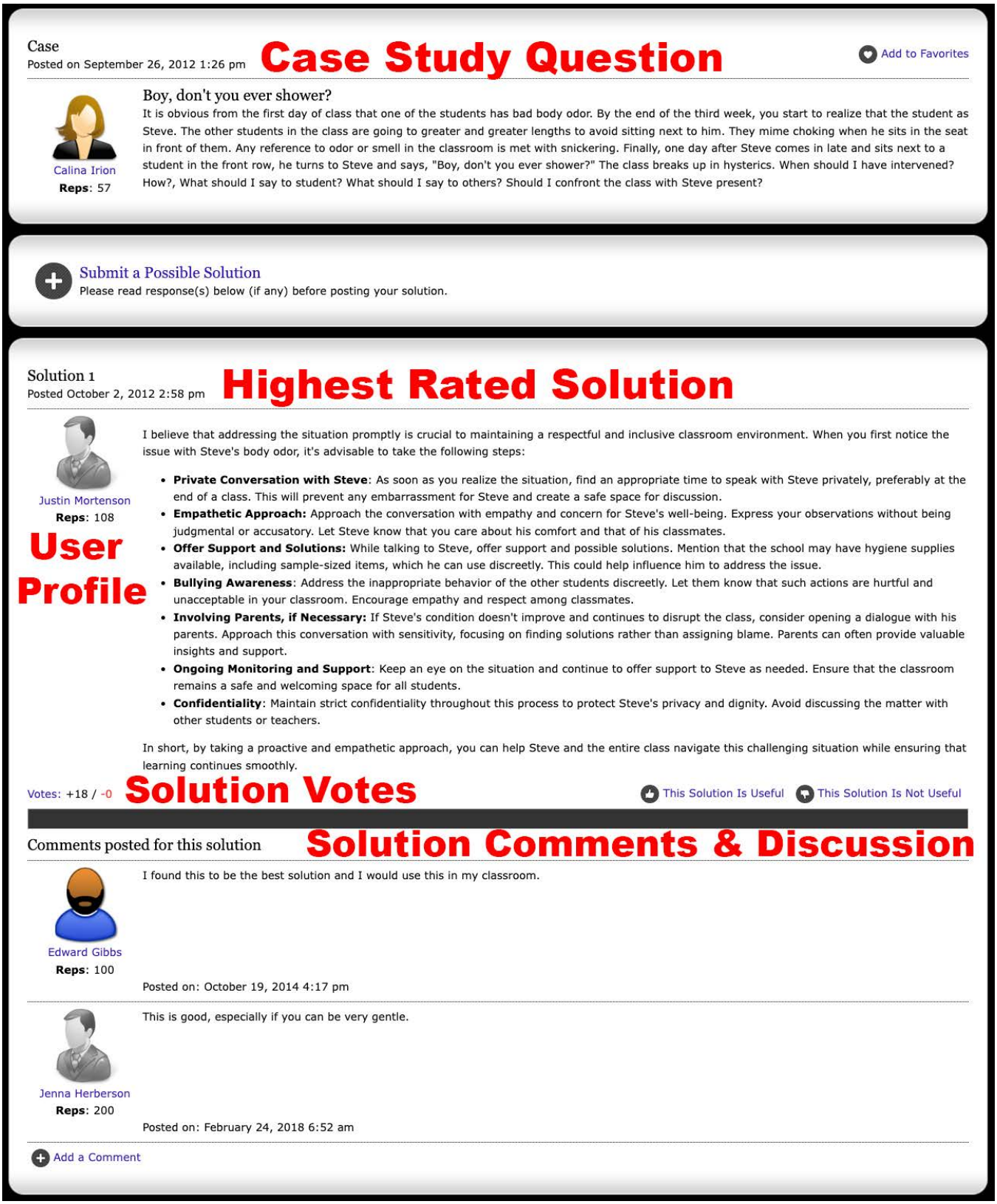

Figure 2. A Case Study Screenshot located at https://tinyurl.com/case62

Methodology

This quasi-experimental study with pretest-posttest and descriptive surveys focuses on students' experiences (learning gains and perceptions) participating in case-based learning face-to-face and online. Quasi-experimental methods that involve creating a comparison group are most often used when it is not possible to randomize individuals or groups into treatment and control groups (Cook & Campbell, 1979). Although the independent variable is manipulated, participants are not randomly assigned to conditions or orders of conditions (Cook & Campbell, 1979). The following is the notation of the research design.

N1 O1 X1 O2 N2 O1 X2 O2 O3

N1: Students in face-to-face case-based learning (control group),

N2: Students in online case-based learning (experiment group),

X1: Face-to-face learning

X2: Online case-based learning

O1: Pretest, O2: Posttest, O3: Student perception survey

Research Questions

1) Is there any significant difference in preservice teachers' learning gains between face-to-face and online case-based teaching regarding classroom management?

2) What are the preservice teachers' perceptions regarding using face-to-face and online tools for classroom management case studies?

Participants

87 undergraduate preservice education students enrolled in two EDG4444 - Classroom Management Course sections participated in the study. The researchers decided which technique to use randomly in which section (Table 2).

Table 2

Study Participants

Course Sections and Case-based Instruction Method	Males	Females	Total
Section 1: Face-to-face Case-based Instruction	11	34	45
Section 2: Gamified Online Case-based Instruction	9	33	42
Total Participants	20	67	87

All students were informed about the research project in detail, provided informed consent to be part of the study, and were informed that their pretest, posttest, and survey participation would be anonymous and would not affect their course grades.

Instruments

Pretest and Posttest

Before the study commenced, students in both sections were administered a pretest consisting of twenty multiple-choice questions directly aligned with the competencies outlined in the Florida Teacher Certification Professional Exam. It's important to note that these pretest and posttest questions were collaboratively developed by three faculty members, each with extensive experience teaching various sections of classroom management courses across multiple campuses of the university over several years. These test questions have consistently adhered to the FTCE Professional Exam competencies and have remained unchanged throughout multiple semesters. To clarify, no modifications were made to the test for the purpose of this experiment. Furthermore, it's worth mentioning that none of the twenty questions were explicitly addressed or discussed during the study. We utilized participants' learning gains on this established test to facilitate a comparison between the control and experimental groups. For illustrative purposes, we have provided a sample question below.

Question 1. Ms. Jennifer's fourth-graders know that if they do something wrong, they must write "I will follow school rules" 100 times during recess. Three students are being punished in this manner today: Jay for poking classmates, Amy for talking during a lesson, and Ed for not completing his homework. According to Dreikurs, Mrs. Shay should consider _____.
a) using more logical consequences as part of her discipline approach.
b) using after-school time for the punishment, as this is more effective
c) using a more imaginative approach to discipline
d) abandoning this approach, as rote writing discipline is ineffective

The interrater reliability analysis (the degree of agreement among faculty members in the same field/degree) showed that the pretest (and posttest) used during this study was found reliable (20 items; from α=.69 to α=.76). Even though no long-term validity test applied to this instrument due to time constraint, internal consistency scores showed positive results (20 items; from α=.71 to α=.77. Also, all of the questions in pretest and posttest are correlated with the classroom management competencies listed in Florida's Teacher Certification Professional Examination (Table 3).

Table 3

Pre-test Post-test Question Groups

Classroom Management Competencies	Number of Questions
Competency 1. Classroom Rules and Procedures	2
Competency 2. Planning and Managing Student Homework	2
Competency 3. Classroom Organization	2
Competency 4. Planning and Managing First Day of School	1
Competency 5. Planning and Managing Cooperative Learning	1
Competency 6. Keeping Appropriate Behavior in Classroom	5
Competency 7. Dealing with Problem Behaviors	5
Competency 8. Communication Strategies for Teachers	2
Total	20

The content validity of the FTCE and FELE examinations is reinforced through the involvement of Florida educators, including teachers, district supervisors, teacher educators, and other education personnel, throughout the test development process.

Student Perception Survey

At the end of the study, all participants were asked to provide feedback on their experiences with the case-based learning approach by completing a survey. The survey's questions varied from the Likert scale (10 items) to open-ended questions (2 items). The researchers also added five additional questions regarding the gamified case-based online tool to be provided to the experimental group. These five additional questions focused on user experience with the online tool website. The interrater reliability analysis showed that the student survey created and used in this study was reliable (10 items: α=.67; 15 items: α=.61).

Research Procedures

During the study, the two sections of the course were taught by the same instructor in the same way they had been taught before (same content, activities, assignments, etc.). The only difference was that while one section completed case-based learning activity via face-to-face classroom discussion, the other used the online tool. All students in both sections completed the task in the classroom during the scheduled class meeting time. Students and the instructor spent three weeks on this activity in both sections. The experimental group (online group) students were asked to bring their personal laptop computers. The instructor also provided information on borrowing a laptop from the college library if needed.

The experiment for the face-to-face discussion group started with students taking the pretest on the first day of the project. After collecting the pretest, the course instructor gave each student the cases as a hard copy. Six cases during the first session and seven cases during the

second and last session (week) were distributed to students. During each session, students were asked to develop a summary and prepare an individual response for each case. Then students worked as a group to develop a consensus response for each case. The instructor then presented each case on-screen and invited groups to discuss possible solutions students generated. At the end of the third session, students were asked to take the post-test and complete an online survey for their perception of the experiment.

The gamified online case-based instruction group also started by taking the pretest on the first day of the project. The course instructor then provided brief information on accessing the website, creating an account/login, and viewing and responding to the cases. The instructor also explained points, badges, rankings, and how to earn them. Then, the students were asked to start reading and responding to twenty initial cases online and move to other cases. During the last day of the activity, students were asked to take the posttest and student perception survey.

Results

Pre-test and Post-test Results

To answer the first research question regarding comparing learning gains, researchers analyzed the pretest and posttest scores by calculating independent t-tests in SPSS. The independent t-test is an inferential statistical test that determines whether there is a statistically significant difference between the means in two unrelated groups (Box et al., 2005). The table below presents descriptive statistics and independent t-test analysis (Table 4).

Table 4

Overall Pretest and Posttest Score Comparison (Face-to-Face vs. Gamified Online)

Groups								
	Face-to-face Case-based Instruction (*n*= 45)		Gamified Online Case-based Instruction (*n*=42)		95% CI for Mean Difference			
	M	*SD*	*M*	*SD*		*t*	*df*	*p*
Pretest	7.84	1.52	7.71	1.36	-.488, .748	.419	85	.677
Posttest	15.98	1.93	19.05	0.96	-3.729, -2.411	-9.261	85	.001*

*p <.05.

Pretest comparisons showed no significant difference between the face-to-face and gamified online case-based instruction groups. The two groups seemed equal at the start of the experiment due to their pretest scores. When researchers compared the learning gains, the results showed that gamified online case-based instruction groups scored significantly higher on their post-test than the face-to-face case-based instruction group.

The researchers also compared the pretest and posttest scores based on classroom management competencies. The pretest comparison results showed no significant differences between the two groups in any of the competencies except for “Planning and managing cooperative learning.” For this competency, the online group scored higher than the face-to-face group. On the other hand, the results demonstrated significant differences in the two groups’ post-test comparison for all competencies. In short, the gamified online group scored significantly higher than the face-to-face group in all competencies (Table 5).

Table 5

Competency-Based Pre- and Post-test Comparison (Face-to-face vs. Gamified Online)

	Groups							
	Face-to-face Case-based Instruction (*n*=45)		Gamified Online Case-Based Instruction (*n*=42)					
	M	*SD*	*M*	*SD*	*95% CI* for Mean difference		*t*	*df*	*p*
Comp 1. Pretest	0.96	.208	0.90	.297	-.058	.160	.928	85	.356
Comp 1. Posttest	1.76	.435	2.00	.000	-.378	-.111	-3.64	85	.001*
Comp 2. Pretest	1.02	.260	1.07	.296	-.114	.111	-.028	85	.978
Comp 2. Posttest	1.84	.367	1.98	.154	-.253	-.010	-2.15	85	.034*
Comp 3. Pretest	0.13	.344	0.11	.328	-.129	.158	.198	85	.843
Comp 3. Posttest	1.78	.420	2.00	.000	-.351	-.093	-3.42	85	.001*
Comp 4. Pretest	0.33	.477	0.36	.485	-.229	.181	-.231	85	.818
Comp 4. Posttest	0.81	.318	1.00	.000	-.209	-.014	-2.26	85	.026*
Comp 5. Pretest	1.02	.260	0.90	.370	-.018	.253	1.72	85	.089
Comp 5. Posttest	0.82	.387	1.00	.000	-.296	-.059	-2.97	85	.004*
Comp 6. Pretest	1.42	.654	1.51	.707	-.390	.190	-685	85	.495
Comp 6. Posttest	3.69	.763	4.57	5.90	-1.17	-.590	-6.02	85	.001*
Comp 7. Pretest	1.98	.621	1.90	.656	-.199	.345	.533	85	.595
Comp 7. Posttest	3.38	.984	4.50	.634	-1.47	-.767	-6.27	85	.001*
Comp 8. Pretest	1.07	.213	1.12	.221	-096	.153	-.034	85	.865
Comp 8. Posttest	1.77	.387	2.00	.000	-.296	-.059	-2.97	85	.037*

Note. **p* <.05. Competencies (1) Classroom Rules and Procedures, (2) Planning and Managing Student Homework, (3) Classroom Organization, (4) Planning and Managing the First Day of School, (5) Planning and Managing Cooperative Learning, (6) Keeping Appropriate Behavior in Classroom, (7) Dealing with Problem Behaviors, (8) Communication Strategies for Teachers

Survey Results

The second research question focused on student perceptions regarding the application of face-to-face and gamified online case-based instruction. According to the results, both groups showed highly positive feedback about the case-based instruction. However, for statements 2, 3, 4, 7, and 9 gamified online, the case-based instruction group showed significantly higher scores than the face-to-face case-based instruction (Table 6).

Table 6

Student Survey Results

		Face-to-face		Gamified Online		Diff
#	Statement	Mean	*SD*	Mean	*SD*	
01	Case activity helped me develop a deeper understanding of classroom management concepts	4.36	0.61	4.50	0.59	.251
02	Case activity helped me have a better grasp of the practical application of core course concepts	3.67	0.62	4.40	0.59	.001*
03	Case activity helped me take a more active part in my learning process	4.09	0.64	4.55	0.59	.001*
04	Case activity helped me develop positive peer-to-peer relationships	4.27	0.62	4.50	0.55	.001*
05	Case activity helped me to be more engaged (motivated)	4.36	0.61	4.50	0.55	.252
06	Case activity helped me understand about the responsibility of the teacher establishing communication with students	4.42	0.58	4.45	0.63	.608
07	Case study helped me learn more about the resources available both inside and outside of the school	4.29	0.59	4.43	0.59	.001*
08	Case study helped me understand that each situation can be unique with multiple possible solutions	4.42	0.58	4.52	0.59	.594
09	Case study activity provides better retention of information	4.29	0.66	4.48	0.63	.001*
10	Case study activity was enjoyable	4.40	0.58	4.48	0.63	.401

Note. Scale: 5 (Strongly Agree), 4 (Agree), 3 (Neutral), 2 (Disagree), 1 (Strongly Disagree) *Shows significant difference from other groups (p = .05)

The researchers also added specific questions regarding the online tool, which were only provided to the online tool group. The results were highly positive (Table 7).

Table 7

Survey Results Regarding Online Tool

#	Statement	Gamified Online Group	
		Mean	*SD*
01	Website used for this activity looks clean and functions well	4.67	0.48
02	Prompts, guides, and examples integrated into the website were helpful	4.57	0.59
03	The reward system (gamification) integrated into the website was engaging	4.83	0.38
04	Features such as voting, commenting, and favoriting member posts integrated into the website were engaging	4.81	0.40
05	I recommend the use of the website and case studies for the future students of this course	4.90	0.30

Note. Scale: 5. Strongly Agree, 4. Agree, 3. Neutral, 2. Disagree, 1. Strongly Disagree.

Discussion

A case-based learning is usually described as learning with the description and discussion of a situation or a scenario, commonly involving a decision, a challenge, an opportunity, a problem, or an issue faced by a person or persons in an organization (Goeke, 2008; Harrington, 1995). Case-based learning cases do not require simple or explicit answers; instead, they provoke students' critical thinking, illustrate how to think professionally and urge students to use theoretical concepts to highlight a practical problem (Dowd & Davidhizar, 1999; Herreid, 2004). In teacher education, the case-based learning method relies heavily on individuals or groups reading cases, writing a response paper, and perhaps having a classroom discussion. Discussing cases encourages student-teacher interaction and collaboration because students can think about the situation and identify possible solutions (Levin, 2002; Manouchehri & Enderson, 2003; Mastrilli & Sardo-Brown, 1999, 2002). However, there are many challenges in implementing case-based learning in teacher education program courses, such as limited class time to discuss cases, lack of equal student participation, and lack of anonymity for students to express their ideas and views (Cohen & Martin, 2023). Literature investigation showed that some researchers

attempted to use online discussion forums to overcome case-based classroom learning challenges. However, the results of these studies also showed new challenges and limitations, such as students going off-topic during online discussions, posting only agreement messages rather than solutions to cases, excessive student focus on only newly published cases, lack of marking posts as solutions or comment to solutions, lack of gamification, etc. (Hewitt, 2003; Medler & Magerko, 2011; Reischer et al., 2017; Silverman et al., 1992; Unal et al., 2016).

The motivation of this study was to explore the possibility of creating and trying out a gamified online case-based learning tool for case-based teaching and compare the effectiveness of the online platform with face-to-face implementation. The web-based platform, located at teacherserver.com was to support the presentation of classroom management cases in a structured format and allow students to work with cases to post solutions, comments, rates, evaluations, etc. While creating the tool, the researchers considered all the challenges of implementing case-based teaching in face-to-face and discussion forum formats. After completing the online platform, researchers investigated and compared student learning outcomes and perceptions between face-to-face and gamified online case-based learning.

The main result of this study was that the overall case-based learning activity was undoubtedly a positive experience for both groups (face-to-face and online) in terms of learning gains and student satisfaction. This result was harmonious with and confirmed the other studies discussing the potential benefits of case-based instruction (Diamantes & Ovington, 2003; Kolodner & Simpson, 1989; Zottmann et al., 2012). Comparing face-to-face and gamified online case-based instruction showed essential differences in student learning outcomes.

Student Achievement

To evaluate and compare the effectiveness of the case study teaching face-to-face versus online, pretest and posttest questions aligned with the classroom management competencies listed on the Florida Teacher Certification Examination (FTCE, Professional Knowledge) were used. Pretest and post-test data analysis showed that learning gains were significantly higher for the gamified online case-based group when compared with face-to-face. In addition, a comparison of learning gain by competencies also showed that gamified online group scored higher than the face-to-face in all competencies. Several reasons might contribute to the significant difference between the face-to-face and online formats.

As indicated before, one of the difficulties with implementing case-based instruction was "managing time to cover a lot of cases" because each case requires an extensive discussion during the class sessions. Even though the cases and FTCE classroom management competencies are carefully selected, the three-week timeline did not allow time to discuss other possible cases or issues. The online platform brought the possibility of covering much more than the twenty cases selected by the instructor. Students could work on not only the teacher-selected twenty cases and many more cases available in the system for students to read, respond to, rate, or comment on. Another contributing factor to the success of the online format can be explained by its positive impact on student motivation, participation, and deep learning.

Jones (2009) has developed the Music model of student motivation, which identifies five main factors that contribute to student motivation: (1) Empowerment, (2) Usefulness, (3) Success, (4) Interest, and (5) Caring and suggest that instructors should consider these components when designing instruction. Researchers in this study believe that the online platform created opportunities to cover all five motivation components. For example, the empowerment component suggests that students feel empowered by having the ability to make

decisions about some aspects of their learning. As opposed to the face-to-face format, the online platform provided students with the opportunity to choose their learning materials (option to choose cases to analyze), allowed students to control the pace of their learning (in class and at home), and allowed students to express their opinions (time for all voices, anonymous posting). Regarding the "usefulness" component, the platform was an excellent example to help students understand why their learning was useful to their interests, career goals, and/or the "real world." Beginning preservice teachers are expected to not have enough knowledge or experience in their field to understand the types and variety of knowledge and skills needed for a particular career or in the real world. Unlike the face-to-face version, the online platform provided numerous cases, issues, and problems a teacher could face. It provided an opportunity to discuss possible solutions before they started their career. The "success" component refers to students believing they can succeed if they put forth the required effort. Jones (2009) suggests that to accomplish this, the instructor needs to structure the learning activity to be challenging, provide feedback about students' knowledge and skills, and provide the resources necessary for students to succeed. The online platform accomplished this component by ordering the learning activity by difficulty level, starting with the easiest (read cases, read responses, and rate them), progressing to the hardest (post solutions that other users rank with high scores for the leaderboard). Doing this allowed students to feel a sense of competence as they progressed. A face-to-face version of case-based learning did not allow much opportunity for the "success" component. The "interest" component advocates that instructors should be aware that they can influence students' interests and ensure that their classroom activities interest students. The online platform's gamification function (earning points, badges, scoreboard, etc.) was an excellent example of the learning element. It provided students with a motivational environment for earning points, opportunities

for social interaction, and engendering their emotions. The gamification function was not available in the face-to-face version of case-based learning. The "caring" component suggests that instructors should demonstrate to students that they care about whether students successfully meet the learning objectives. The online format of the case-based learning allowed the instructor to accomplish the "caring" component better than the classroom version because the platform provided an environment for all students to talk (post solutions and comments), choose to speak anonymously (free speech without any judgment), and listen to each other (read others' posts).

Student Perceptions

The analysis of the student survey showed that participants in both groups showed overall positive perceptions and generally agreed that case-based learning was enjoyable. The experience helped them develop a deeper understanding of classroom management concepts, have a better grasp of the practical application of core course concepts, take a more active part in their learning process, develop better peer-to-peer relationships, become more engaged/motivated, understand the teacher-student relationship better, learn about resources available in and out of the classroom, understand that each situation can be unique with multiple possible solutions and increase their retention of information. The scores varied from 3.67 to 4.55.

On the other hand, looking at the score differences between the two groups on the student perception survey, researchers found out that for some of the survey items (#2, 3, 4, 7, 9), the online group showed significantly more positive perceptions than the face-to-face group. Specifically, students in the online group indicated that the experiment helped them to (1) learn how to apply course concepts to real life, (2) gain better retention of information, (3) experience positive peer-to-peer interaction, (4) control their learning process, and (5) be aware of resources

available in and outside of the school. The researchers suggest that the advantages of implementing case-based activity using an online platform can explain the score differences.

Students indicated that the numerous cases posted on the online platform made them think about countless situations that may happen in their classrooms and that they had a chance to apply what they learned in class to real-life situations. The relevance of the case studies points to authentic learning (Herrington et al., 2010). Authentic learning experiences comprise complex tasks that have real-world connections. The relevance of the cases may have affected student motivation. Relevance is recognized as an important factor in student motivation by many motivation theories and models, such Expectancy-Value Theory (Atkinson, 1964) and the ARCS design (Keller, 1987). Students also expressed how the case-based instruction helped them be aware of multiple perspectives and change their epistemological beliefs about knowledge (i.e., there might be multiple truths in the world, which are constructed among people involved). The online platform also allowed students to see how other students would approach the problems described in the cases. This was evident in some comments where students expressed their thoughts about a response with phrases like “I did not consider the issue from that angle” or “I had not considered how beneficial it would be to move from A to B.” This also helped students to unlearn the tendency of always looking for the right answer instead of looking at the problems from multiple perspectives using multiple solutions (critical thinking).

Students in the online group also agreed that the gamified platform provided an environment to support student-student interaction. They could post solutions and have an extensive discussion under each possible solution as to whether they agreed with the solution with an explanation. Students could see why someone agreed with them, obtain further ideas to enhance their solutions, and ultimately consider details they may have missed when they

responded to the case. Such interaction can enhance a person's self-efficacy, especially when their perspectives are validated by praise and agreement statements. Cherubini (2009) used case studies to enhance preservice teachers' critical thinking skills and found, as a result of his analysis of participants' reflections on the process, that using case studies increased self-confidence. In addition, he discovered that his participants challenged stereotypes and promoted social cohesion through their responses.

Providing students with many case studies from which they could choose the ones they want to respond gives them a sense of autonomy. Cases were written on a variety of issues. Therefore, if students were uncomfortable responding to cases on a certain topic, they could find cases on many other topics. Moreover, the technology used in the study allowed the students to see others' responses which may have given them a sense of security when they saw responses of people with similar perspectives on these controversial issues.

Literature on using gamification strategies in the classroom suggests that timely and frequent feedback increases user engagement with certain activities (Lee & Hammer, 2011; Sicart, 2008). This hypothesis is supported by data from this study, where student buy-in was at its highest when students could monitor their performance on a leaderboard as they gained points for the activities they participated in the project (posting a case, responding to a case, rating solutions, etc.) and received progress reports with detailed information about their point total. Another factor that may have affected student motivation is that students' responses to cases were published on a website. Students with an audience beyond the teacher for their work will likely be more motivated.

Finally, the website setup may have contributed to the positive feedback from students. Many students mentioned how easy it was for students to navigate the website. Students could

view the case studies with two clicks. They could check the points they accumulated with an additional click. The website's design made it very predictable for the students to move from one place to the next. Therefore, the simplicity of the website was a positive aspect of the online platform.

Conclusion

This study sought to investigate the effectiveness of a gamified online case-based learning tool compared to traditional face-to-face instruction in the context of teacher education, specifically focusing on classroom management. The results of this research provide valuable insights into the advantages of implementing such a tool in educational settings.

First and foremost, it is evident from the data that both the face-to-face and online groups benefited significantly from the case-based learning experience in terms of learning gains and overall satisfaction. This finding aligns with existing literature, underlining the value of case-based instruction in enhancing critical thinking and problem-solving skills, which are crucial for aspiring educators.

However, the study's most striking outcome was the marked superiority of the gamified online case-based learning platform over the traditional face-to-face approach in terms of student achievement. The online group demonstrated significantly higher learning gains, indicating that this format allowed for a more effective and comprehensive exploration of classroom management competencies. The online platform's ability to offer a wider selection of cases, thus enabling students to delve deeper into the subject matter, was a key contributing factor to this success. Additionally, the platform's gamification features, such as points, badges, and leaderboards, played a pivotal role in motivating students to actively engage with the learning

materials, fostering a sense of empowerment, usefulness, success, interest, and caring, as outlined in the MUSIC model of student motivation.

Furthermore, student perceptions of the online platform were overwhelmingly positive, with participants noting its capacity to provide real-world relevance, encourage multiple perspectives, and enhance critical thinking skills. The platform's ability to facilitate peer-to-peer interaction and provide autonomy to students in choosing cases that resonated with their interests contributed to their overall satisfaction. The importance of timely feedback and the opportunity to showcase their work to a broader audience also motivated students, fostering a sense of ownership and pride in their learning journey.

Implications

One of the most practical implications of this study is that the study helped researchers create an online tool that is now publicly available free to all educators at www.teacherserver.com. The tool is now being used by many institutions and educators worldwide. The variation of people and cultures also provides different perspectives from different cultures/countries. Teacher educators are integrating the tool into their courses and field experiences, and teachers are using the cases to seek help with their difficulties in classroom management and other areas. The users requested that researchers add sections for different topics to create different cases in addition to classroom management. Currently, the topics are assessment, dealing with parents, dealing with ESOL students, multicultural education (diversity), dealing with parents, teaching job interviews, and ethics. Hundreds of cases are added to the tool, and more are added daily. The researchers will keep the tool available for all educators (free) and improve it as future users offer suggestions.

The study's results demonstrated that using cases can be a refreshing teaching approach and help students take much more responsibility for their learning. But because cases are not necessarily the best way to communicate large amounts of new information, they should be seen as something other than lecture replacements. By placing students in real-life situations and asking them to make critical decisions, case studies force students to connect their knowledge of facts with the need for evaluative skills.

Moreover, when students are immersed in a meticulously structured online learning environment that fosters robust interaction, encourages extensive case discussions, facilitates the rating and commenting on peers' solutions, and rewards active participation with points and badges, the outcomes can significantly surpass expectations.

Future Research Recommendations

Based on the findings and insights obtained from this study, several recommendations for future research can be outlined. Firstly, it would be valuable to conduct further investigations into the application of gamified online case-based learning in various educational contexts beyond teacher education. Exploring its effectiveness in different disciplines and levels of education could shed light on its adaptability and impact on diverse student populations.

Secondly, future research can delve deeper into the design and implementation of gamified elements within online case-based learning platforms. Understanding how specific gamification features, such as points, badges, or leaderboards, influence student motivation, engagement, and learning outcomes can provide guidance for educators in tailoring their instructional strategies.

Additionally, researchers could explore the potential challenges and limitations of gamified online case-based learning, addressing issues such as online etiquette, student

accountability, and the management of large-scale online discussions. Investigating strategies to mitigate these challenges and enhance the overall online learning experience would be beneficial. Furthermore, comparative studies examining the cost-effectiveness of gamified online case-based learning platforms in comparison to traditional face-to-face instruction and other online teaching methods can provide institutions with valuable insights for resource allocation and decision-making.

Lastly, as technology continues to advance, future research could explore the integration of emerging technologies, such as virtual reality or artificial intelligence, into gamified online case-based learning platforms to further enhance the learning experience and engagement of students. By pursuing these avenues of research, educators, policymakers, and instructional designers can continue to refine and optimize the use of gamified online case-based learning as a powerful tool for improving educational outcomes and fostering student motivation and engagement.

Limitations

This study, while providing valuable insights into the benefits of gamified online case-based learning, is not without its limitations. One significant limitation pertains to the sample used for data collection, which comprised undergraduate students from a single institution enrolled in a specific course. Generalizing the findings to a broader educational context may require a more diverse and representative sample, including participants from various courses and institutions with differing instructional approaches.

Additionally, the study's focus on classroom management competencies within teacher education may limit the extrapolation of results to other subject areas. Future research can aim to encompass a wider range of academic disciplines to assess the applicability and impact of

gamified online case-based learning across various fields of study, thereby providing a more comprehensive understanding of its potential benefits and limitations in diverse educational settings.

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