

Branching Scenarios: A Strategy to Increase Teacher Candidates' Knowledge of Classroom Management Methods

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Abstract: *This paper details a study conducted on teacher education students enrolled in an Education Foundations course using the Hyflexmodality. HyFlex (Hybrid - Flexible) classrooms are a teaching approach that allows students to choose whether to attend classes in person or remotely, according to their preferences or circumstances. Select course modules focused on classroom management concepts and strategies using school - related case studies that incorporated branching scenarios. Branching scenarios are dynamic and immersive instructional tools that allow learners to determine what comes next in a case study. Five teacher candidates participated in the study, which included a pre - and posttest. The pre - test was composed of traditional case studies with multiple - choice questions without branching scenarios. The post - test included case studies with question options that featured branching scenarios. A paired - samples *t* - test was used to compare the mean scores for the pre - and post - tests, two occasions. Results indicate that mean scores increased after the intervention of classroom management case studies with branching scenarios. The teacher candidates were positively impacted by this novel instructional tool.*

Keywords: branching scenarios, interactive learning, classroom management, hyflex classroom

1. Introduction

There are several ways to actively engage teacher education students in the traditional learning environment. Thoughtful teacher educators identify strategies to help teacher candidates practice skills before they confront high - stakes situations in today's schools and classrooms. "When educators are working with learners in person, this practice may come in the form of coaching, shadowing, or role playing. But in the online [or Hyflex learning environment], educators need to look for other solutions" (Lynch, 2021). HyFlex (Hybrid - Flexible) classrooms are a teaching approach that allows students to choose whether to attend classes in person or remotely, according to their preferences or circumstances. In the hyflex classroom, "students are given choice in how they participate in the course and engage with material in the mode that works best for them over the course and from session to session" (Columbus University Office of the Provost, 2023). The lecturer uses technology to deliver the same content to both in - person and remote students, ensuring that all students have access to the same learning opportunities and resources. One technological solution to provide relevant practice in this mixed learning environment is to integrate branching scenarios within the lecturer's learning activities. A branching scenario is a lesson design approach that introduces a prompt that has multiple decision points and options to solve (Chetia, 2019), and requires learners to make decisions in response to a case study or simulation and interpret the immediate feedback of those decisions during the lesson. In other words, the direction the learner follows through the case study varies based on the decisions the participant makes (Holex, 2021). The choice that a teacher education student makes during the lesson determines specific pathway that unfolds during the scenario, much like a gaming environment. This instructional design approach makes for an unpredictable and interactive student learning

experience (Snegirev, 2016) that can showcase real - world problem - solving circumstances, such as dealing with classroom management issues in today's schools. While traditional case studies have been a standard instructional method in teacher education programs (Christ, et al., 2017), in both online and face - to - face learning environments, the addition of branching scenarios to teach classroom management strategies in teacher education programs, is the core of the current investigation. In fact, one expert shares, "Scenario training can help teachers work through these situations ahead of time and practice techniques for engaging students and managing a rowdy class" (Lynch, 2021).

Teacher education faculty members train teacher candidates to support today's schools as highly proficient professional educators, and this includes effectively managing classrooms and improving students' behavior. Some assert that teacher training programs fail to adequately prepare aspiring teachers to implement a successful classroom management strategy (Simonsen, et al., 2013). This process involves establishing a positive classroom environment which encompasses nurturing effective teacher - student relationships (Wubbels, Brekelmans, Van Tartwijk & Admiraal, 1999). Teacher candidates should be provided the opportunity to learn and practice methods to create "a supportive environment for the academic and social - emotional learning of students" (Korpershoek, et al., 2016). Content and pedagogical knowledge are tenets of effective teachers, according to professional standards and practices (Council for the Accreditation of Educator Preparation, 2021). Several experts define general pedagogical knowledge as knowledge that goes beyond content knowledge to include classroom management (Mishra & Koehler, 2006; Shulman, 1987; Cothran & Kulinna, 2005). More specifically, teacher candidates should acquire the pedagogical knowledge and skills to:

Volume 12 Issue 9, September 2023

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...develop caring, supportive relationships with and among students;
organize and implement instruction in ways that optimize students' access to learning; encourage students' engagement in academic tasks, which can be done by using group management methods; promote the development of students' social skills and self - regulation; and use appropriate interventions to assist students with behavior problems" (Korpershoek, et al., 2016).

Teacher educators design instructional activities that provide opportunities for teacher candidates to make decisions about the classroom environment, choose the tools and techniques to create welcoming and interactive learning spaces with pupils as the central focus, and decide on the methods employed to regulate student behavior. Teacher candidates must make teaching and learning decisions about classroom spaces, instructional time, equipment, technology, movement, learning activities, materials, and supplies. "Teachers who effectively manage their classrooms, maximize student engagement and increase the probability of academic success. Thus, classroom - management skills are critical for all teachers and students" (Simonsen, et al., 2013). Some assert that "teacher educators struggle to find the most effective ways to teach pre- service teachers classroom management" (Evertson, C. M., & Weinstein, C. S., 2006; Rudolph, 2008). In fact, research shows that classroom behavior problems are a major contributor to teacher burnout and emotional distress (Bakker, Hakanen, Demerouti, & Xanthopoulou, 2007; Boyle, et al., 1995). Others put forward that the "probability of a teacher acting to resolve the situation is low if he or she lacks belief in his or her capability to manage classroom disturbances effectively" (Dicke, 2014). One approach to increasing teacher candidates' self - efficacy, knowledge and skills in classroom and behavior management is to analyze case studies and classroom scenarios which require students to think critically, apply theory and make logical decisions that support efficiency and effectiveness in the classroom. More specifically, branching scenarios can introduce the teacher candidate to behavior challenges that could take place in the classroom, and as the candidate is faced with a pupil that displays problematic behaviors, they must decide on the best course of action to take to diffuse the situation. The path that teacher candidates follow through the learning activity will vary based on those decisions. Once a decision is made, feedback is given about the decision and learners are presented with their results along with reflection prompts on the areas they may need to improve (Holex, 2021). "Branching scenarios encourage discussion amongst learners of the routes they took and the outcomes of their decisions. They can learn from the resource, their own journey, and that of others" (Holex, 2021). This can serve as a value - added experience for aspiring professional educators working through concepts in a virtual learning environment.

Branching scenarios present learners with non - linear problem - solving situations that are relevant to the discipline of study. Unlike a linear assessment, such as a

quiz or essay exercise, a branching scenario affords the learner the opportunity to select an option that they believe is the most appropriate choice based on the circumstances presented in a specific case and based on the consequences, decide whether their selection was the best option based on the advantages or disadvantages of their decision. Much like applying theory to practice, the branching scenario enables learners to test their knowledge or skills and quickly identify any specific gaps in understanding or misconceptions related to the concepts of the lesson. This is ideal for teaching classroom management concepts since "classrooms are multidimensional situations in which events happen simultaneously, often taking unpredictable turns" (Doyle, 2006). To be effective, teacher candidates must learn how to respond to classroom misbehaviors quickly. "Effective classroom managers are always aware of what is going on in all parts of the classroom (with - it - ness), they are able to effectively handle two or more classroom events at the same time (overlapping), and their teaching has a steady pace throughout the lesson (momentum) " (Voss, et al., 2011). Branching scenarios allow teacher candidates to practice these skills within the virtual learning environment of a teacher education program.

According to experts, there are notable benefits to incorporating branching scenarios in instruction. Branching scenarios (1) offer opportunities to apply real - world examples of theories and abstract constructs, (2) involve deep learning, (3) promote insight into circumstances that are often challenging and complex, (4) allow students to control the trajectory of the case so that they can understand the impact of their choice (s), and (5) increase learner motivation, retention, and transfer of key skills (Third Term, 2021). At the heart of a branching scenario is the user's experience and the decisions the user makes throughout the case. Working much like a flow chart, this interactive approach to analyzing case studies is described as immersive, simplistic, and complex (Buckley, 2020). "Learning how to make judgement calls – and how to face the consequences of one's own choices – is a vital piece of educating students, one that's particularly suited to this teaching tactic" (Office of Distance Education and eLearning, 2019). Branching scenarios discourage students from moving back to another pathway or selecting a different option once they make a choice and discover the consequences of their decisions.

In a traditional sense, case studies are used in a variety of fields of study. In the business world, case studies have been widely used, and according to recent studies, branching scenarios are applied as a "tool to promote further discussion, to inform policy and planning, and, importantly, to prompt articulated actions by powerful stakeholders" (Cairns, et. al, 2017). In one study, the researchers introduced tiered branching scenarios to "outline both a positive and a negative future for the region...The central intent in introducing branching scenarios was to ensure that the potential for local agency under all global/national conditions was made explicit and brought into the discourse of the study participants. To add, the branching scenario approach enabled investigators to "present different polar regional outcomes while global/national factors were either at their 'best' or 'worst'" (Cairns, et. al, 2017). In this

instance, study participants selected a particular action related to regional outcomes, discovered the consequences, and actively engaged in the critical thinking, decision-making and problem-solving exercises on global/national factors.

In another example, nurse educators incorporated a variety of teaching pedagogies to facilitate real-time decision-making skills in their students, including the use of branching scenarios. "When digitized these have come to be known as virtual patients" (Buckley, 2020). Branching scenarios allow for case studies to mimic real-life medical care situations that can often replicate fast-changing patient conditions that require nursing students to monitor and adjust. In a recent study, nursing educators embraced branching scenarios to expose nursing students to "filtering and analyzing multiple sources of patient data (vital signs, lab values, imaging, medications, and referrals), as well as reviewing evidence-based guidelines and policies and procedures" (Pasklinsky, 2021). Using branching scenarios, students were required to navigate each step of the process, take control of the course of action, and lead the case towards the most suitable outcome for the patient. It is for similar reasons that the current study explored using branching scenarios in teacher education.

In teacher education, case studies are common to "represent the complexity of the classroom situation and to assess the more procedural knowledge of classroom management" (Voss et al, 2011). In one study, researchers (Voss et al., 2011) claimed that the case study strategy proved effective in assessing the classroom management techniques of teacher candidates, and they further asserted that "it is reasonable to ask them to identify sources of disruption or student misbehavior in these vignettes and to specify strategies to prevent classroom disruptions." A major conclusion of this study is, based on pupil ratings of instructional quality, candidates with high scores were better equipped to prevent classroom disruptions and behavior problems. These benefits were a major consideration in the decision to use case studies in this study.

The purpose of the current study was to determine whether teacher candidates would improve their understanding of classroom management techniques using a traditional case study method in comparison to the use of case studies along with branching scenarios. The research question is, "Is there a significant change in teacher candidates' Classroom Management Test scores following participation in branching scenario case study learning activities designed to increase students' confidence in their ability to effectively manage their classrooms, maximize student engagement and increase the probability of academic success of their pupils? Does the intervention have an impact on participants' Classroom Management Test scores?"

2. Methods

A pretest posttest experimental design was used with a convenience sample of five teacher education candidates. The inclusion criteria of the study were pre-professional, teacher education students who were registered for an Education Foundations course. The course met weekly for

13 weeks, and included a 3-hour timeframe, which encompassed 2-hours of lecture and a 1-hour tutorial. The study was conducted at a public university in the Caribbean.

Sample

The subjects for the study were teacher education students (n = 5) who were enrolled in an Education Foundations course with weekly class sessions focused on dispositions and pedagogical knowledge, including topics focused on classroom management. The class was offered using a Hyflex model. In HyFlex learning environments, learners have hybrid and flexible options to attend virtually (synchronously), virtually (asynchronously) or in the face-to-face classroom. Each student enrolled in the hyflex classroom is responsible for demonstrating sufficient progress towards the learning outcomes of the course, and fully participating in the same curricular learning activities and assessments, regardless of modality. The aspiring teachers were enrolled in a teacher educator preparation program. Each of the participants was a female student with some experience in working with children either as a teacher assistant or tutor. The age range of the sample was 25 to 45 years of age. None of the students had previous experience with branching scenarios. Each held a first degree in a discipline other than teacher education.

Instrumentation

Microsoft PowerPoint was used to develop branching scenarios. PowerPoint was selected to administer the branching scenarios because it was cost effective and readily accessible. Additionally, the instructor was able to easily embed shapes and animation on specific slides that were used to navigate to sections of the slideshow that continued the storyline based on the participant's selection. Modules were designed using case studies developed by means of the AI platform, ChatGPT and select textbooks. For the pre-test, the instructor projected the case study slides with multiple-choice answer choices on the screen in the physical classroom space for those students participating in the face-to-face setting ("Roomies"), and simultaneously shared the computer screen on Zoom, the campus web-conferencing platform, for students participating in the online environment ("Zoomies"). Both "Roomies" and "Zoomies" responded to the pre-test by entering their answer-choices within a Quiz1-assignment in Moodle, the learning management system (LMS) for the campus. For the post-test, each student independently accessed the PowerPoint slide show from the LMS, which included the five case studies and their related branching options. They recorded their answer choices within a LMS using a Quiz2-assignment.

3. Data Collection and Analysis

The teacher candidates had two sets of scores, Test 1, which represented results of an assessment based on a traditional case study method, and Test 2, which represented results of an assessment based on five case studies with branching scenarios. A paired-samples t-test was used to determine whether there was a statistically significant difference in the mean scores for Test 1 and Test 2. Data was collected over the course of three weeks of engagement. During Phase 1 of the lesson, the lecturer introduced Classroom Management

modules. The presentations occurred during synchronous, Hyflex instructional sessions, and the details of case studies were explained by the lecturer using web - based resources and an accompanying teacher - made PowerPoint presentation. The presentations did not include branching scenarios, the lecturer prompted discussion and reflection about the cases and students were invited to ask questions about the theories and concepts detailed in the case. A multiple - choice test was administered following Phase I. During Phase II of the lesson, the lecturer introduced the instructional approach of branching scenarios, and included a “how - to” video demonstration, a template and an example focused on classroom management. The presentation occurred during a synchronous Hyflex class session. During the discussion, students were asked to independently access the presentation resources and practice making selections based on the branching options within the example. Students were invited to share their branching pathways, outcomes, and any questions about this instructional tool. Following the lesson, a multiple - choice test was administered on Classroom Management, which included the PowerPoint slideshow with five case studies, related branching scenarios including multiple - choice answer choices and an answer sheet. Descriptive statistics and t - test were computed. The Phase 1 multiple - choice test was deemed the “Test 1” and the Phase 2 multiple - choice test was identified as the “Test 2”. An alpha level of 0.05 was used to determine statistical significance on the inferential test. Descriptive statistics were used to describe the characteristics of the sample and the scores on Test 1 and Test 2. To measure the difference between Test 1 and Test 2, paired t - tests were used.

Pre - test

During a one – hour tutorial session that followed the lecturer’s lesson, the Test 1 assessment was given. The Test 1 assessment included five real - world case study scenarios, each containing a central question with accompanying multiple - choice answer choices related to the theories and concepts introduced during the module.

Scenario - based application

During Phase I of the study, the lecturer introduced a Classroom Management module within the learning management system. Lecture presentations occurred during weekly, synchronous Hyflex sessions, and the details of the case studies were explained by the lecturer using web - based resources and an accompanying teacher - made PowerPoint presentation. During Phase II of the study, the lecturer included a presentation about branching scenarios, as an instructional tool. Because this teaching strategy was new to the students, in that the options split off in separate pathways like tree branches in the slideshow, the lecturer led students through a series of choices to model the navigation features and set the expectations. Throughout this guided practice, the lecturer took the following steps:

- 1) Teacher candidates were allowed to individually take notes on their initial reaction to the case.
- 2) Teacher candidates were prompted to vote according to their initial reaction. This vote advanced the scenario.
- 3) Teacher candidates engaged in a reflective exercise related to the pupil’s behavior displayed in the case.

Reflections were related to the teacher candidates’ decision - making process.

- 4) Teacher candidates were given the scenario to experience on their own to walk through each of the branches. Candidates posed their questions during the session. (Buckley, 2020).

Using this approach, the teacher candidates were able to practice the sequence of steps and ask questions about the ways to navigate the slideshow, lesson expectation and details of the case.

Posttest

During a one - hour tutorial session that followed the lecturer’s lesson, the Test 2 assessment was given. The Test 2 assessment included 5 case study scenarios with a central question and multiple - choice options related to the theories and concepts reinforced during the module. The number of times a student engaged in the module content was not restricted, since the students could move through the scenarios independently during the time allotted for each case. Test 1 and Test 2 scores were only used for student learning purposes and were not included in course grades or the calculation of students’ grade point average. All analyses were conducted using IBM SPSS.

This specific process allowed for an interactive, yet independent problem - solving virtual learning exercise. “Branching scenarios translate a passive learning experience into a more active learning experience” claims Ross Tamburro, an education technologist at The Ohio State University (Office of Distance Education and eLearning, 2019). “You get a really nice, rich experience for the student that they share out, explaining ‘This is why I went to this end point.’ It gets them to think about the material in a deeper, more significant way” (Office of Distance Education and eLearning, 2019). Additionally, branching scenarios provide a risk - free learning environment where teacher candidates, unlike a real classroom, can make the “wrong” decision, adjust their thinking, and try again without any negative consequence to pupils.

4. Findings

All teacher candidates who participated in the study accessed the module and PowerPoint presentation within the learning management system. A paired - samples t - test indicated whether there was a statistically significant difference in the mean scores for Test 1 and Test 2. The results of the paired sample t - test revealed that the mean score of Test 1 significantly changed after the intervention of the branching scenario during the study. Table 1 below details Paired Sample Statistics.

Table 1: Paired Sample Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Test 1	60.00	5	24.49490	10.95445
	Test 2	80.00	5	24.49490	10.95445

Table 1 indicates that the mean score for Test 1 was 60.00, while the mean score for Test 2 was 80.00. We can conclude that there was a significant increase in mean scores from Test 1 (prior to the intervention) and Test 2 (after the

intervention). The standard deviation is also shown as Test 1 (24.49490) and Test 2 (24.49490).

Table 2: Paired Sample Correlations

Paired Samples Correlations					
	N	Correlation	Significance		
			One - Sided p	Two - Sided p	
Pair 1	Test 1&Test 2	5	-.167	.394	.789

Table 2 highlights a Paired Samples Correlation analysis with N=5 to examine the relationship between variables Test 1 and Test 2. The correlation between Test 1 and Test 2 was found to be -.167 (one - sided p=.394, two - sided p=.789), indicating a small and non - significant negative association between the variables.

Table 3: Paired Samples Test

Paired Samples Test										
	Paired Differences	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Significance	
					Lower	Upper			One - Sided p	Two - Sided p

Table 3 provides the probability (p) value in the column labeled Two - Sided p. This p - value of .298 is relatively large, and it suggests that there is no strong evidence against the null hypothesis, there is no significant change in teacher candidates' Classroom Management Test scores following participation in branching scenario case study learning activities designed to increase their confidence in their

ability to effectively manage their classrooms, maximize student engagement and increase the probability of academic success of their pupils. Also note that the Mean difference in the two scores is 20.00000, with a 95 percent confidence interval stretching from the Lower bound of - 26.45881 to an Upper bound of 66.45881.

Table 4: Paired Samples Effect Size

Paired Samples Effect Sizes						
	Standardizer	Point Estimate	95% Confidence Interval			
			Lower	Upper		
Pair 1	Test 1-Test 2	Cohen's d	37.41657	-.535	- 1.454	.439

Table 4 signifies the effect size (Cohen's d) for the paired samples was estimated to be -.535 (95% CI [- 1.454, .439]). The point estimate of -.535 represents the standardized mean difference between two dependent groups (i. e., the effect size), with a negative sign indicating that the mean of the first group is lower than the mean of the second group.

scores of students and that the branching story approach had a positive impact on student learning outcomes. "Analytic decision - making uses a step - by - step analytic thought process to deepen the information used for decision - making" (Rababa & Masha'al, 2020). Overall, an increase in average score from pretest to post - test is generally seen as a positive outcome in the context of an intervention study.

5. Discussion

The study used paired sample statistics to compare the mean scores of a group of individuals on two different tests. The findings of this investigation reveal that branching scenarios had a positive effect on mean scores when comparing Test 1 and Test 2 results. The mean score on Test 2 is substantially higher than the mean score on Test 1. This could suggest that the individuals improved or learned more between the two tests. The results could also suggest that the intervention of integrating branching scenarios had a positive effect on the student learning outcomes for the classroom management module. The increase in average score from pretest to post - test could further indicate that the intervention led to an improvement in the students' performance or knowledge related to classroom management. The findings showcase the usefulness of this instructional approach within the Hyflex learning environment for teacher education majors studying the theories and concepts associated with classroom management techniques. The fact that the standard deviation is the same for both tests suggests that the variability of the scores was similar between the two tests. Rababa and Masha'al, in a recent study in nursing education, also found that incorporating branching scenarios improved the mean

6. Limitations of the Study

It is important to keep in mind that the sample size of 5 is quite small, which may limit the reliability and generalizability of the results. Leading this investigation on a small sample, in a single university, and in one geographical area limits the generalizability of the results.

7. Conclusion

Branching scenarios are not a one - size fits all solution for preparing teacher education candidates to manage classroom behaviors or learning environments in schools. However, this teaching tool allows candidates to hone their skills, increase their confidence and reduce the unpreparedness that comes with taking control of a classroom of students and helping pupils achieve academic success. Branching scenarios create opportunities for teacher educators to facilitate theory to practice situations with an interactive environment in a novel and stimulating way. Using this approach, teacher candidates are encouraged to choose the most appropriate pathway, based on challenging, real - world situations, and problem - solve, apply theory, and

reflect on their selections in a situational - role playing case study. Using this instructional method, learners are afforded the opportunity to choose one course of action among many possibilities related to classroom management, and each choice opens a new path with immediate outcomes and occasions for reflection.

The implications for teacher educators point to the need to prepare teacher candidates by way of case studies which integrate branching scenarios. Teacher preparation faculty should consider the benefits of creating and integrating branching scenarios in the Hyflex environment because they offer more dynamic learning material in comparison to linear instructional strategies. The branching scenario strategy makes use of gaming and storytelling aspects that create a more immersive and interactive learning experience that requires learners to apply and transfer knowledge and skills to circumstances that mimic real - life. These case study situations mirror actual problems that professional educators can face in their roles as classroom teachers. The context of the scenario – the classrooms, pupils, and behavior challenges encountered – play a critical role in this strategy (CommLab India, 2020).

As there is little prior research on using branching scenarios in teacher education as a discipline, the findings of this small study may be useful to teacher educators and teacher education candidates in understanding a novel instructional approach that is unique to the Hyflex learning environment. Additional studies are recommended to add to this body of research and establish more reliable findings that are generalizable to the broader population of teacher education students.

Statement: During the preparation of this work the author (s) used [ChatGPT] in order to [develop case study scenarios to use during instruction]. After using this tool/service, the author (s) reviewed and edited the content as needed and take (s) full responsibility for the content of the publication.

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