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A Pilot Study of Virtual Reality Learning Environments for Criminal Justice Education, Engagement, Learning, and Motivation

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ABSTRACT

Stakeholders in education demand more student retention and graduation. A mixed methods pilot study was conducted that utilized observations, a single-group teaching intervention, and a survey to determine if the Virtual Reality Learning Environment (VRLE) could address motivation and learning needs of criminal justice students. University students participated in a variety of simulations pertaining to use of force, de-escalation, workplace stressors, cognitive behavioral treatments, family social support networks, and reentry services. Observations and surveys were used to collect data about the experience. Results showed that the students gained a better understanding of the topics covered, and they were more engaged in learning overall. There was increased class engagement with the intervention. Most students reported moderate and significant gains in learning, but a meaningful experience was not guaranteed for everyone. The experiences they had with VR could address a variety of real-life situations and contexts within the justice system, to the point that the real-life experiences were more relatable on a personal level. The findings indicate that experiential learning environments found within the VRLE can address engagement issues and motivation needs within this context. This, in turn, increases student learning in ways where they are more likely to effectively complete tasks in a way that adequately satisfies curricular requirements in higher education. The learning satisfaction experienced by students helps in retaining students over time.

Keywords: Virtual Reality; Criminal Justice; Higher Education; Experiential Learning; Simulations

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1. Introduction

Teaching about the criminal justice system in higher education can be a daunting and comprehensive task, especially considering the breadth of the content [1–3]. Educators must make sure students are engaged with learning about a variety of topics, including conflict resolution, mental health interventions, criminal behavior, family involvement, and reentry options. Creativity is needed to retain students, and they need to know that what they learn has practical value. One way to do this is to make activities more realistic where they have direct and indirect connections to the world around us. When access to the real world is limited by time, space, and circumstance, alternative solutions must be available so that students can have more authentic experiences. This is especially the case when trying to understand what happens to criminals and families who experience the justice system and the consequences of that system. Virtual reality (VR) can be used to create experiences related to what happens in real circumstances concerning crime, incarceration, and reentry. Virtual reality is a form of modeling or simulating an interactive environment [4]. Teachers use Virtual Reality Learning Environments (VRLEs) to help students explore VR within the classroom setting. A VRLE could be a computer simulation or a 3d-environment generated by special equipment. The level of immersion can vary according to the equipment available for the experience. Although the idea of VRLEs is a very popular consideration in the 2020s, the amount of time, cost, and energy required for them may not be appealing to educators [5]. It is important to determine what is not only engaging to students concerning VRLEs, but what is also necessary for VRLEs to be practical to what is happening in the real world.

To get the most out of learning about the real world, teachers and students can use experiential learning. Experiential learning emphasizes that learning is not just an outcome. There is a process involved. The experiential learning process has four essential steps [6, 7]. The first step involves an individual encountering a concrete experience in the real world. That experience needs to be able to be evidenced. The second step is the creation of evidence relevant to understanding the experience, which usually is done through observations and reflections. After all the documentation suffices to explain the experience, there needs to be a synthesis of information. This leads into the third step, which is the generation of new concepts and theories because of information synthesis from what has been documented. These findings need to be tested and explored further; thus the fourth step is to conduct active experiments and assessments to learn more about the findings. When this step is complete, the learning process goes back to the first step, where the individual has more experiences. The additional experiences could be focused on a particular phenomenon or expand the territory of learning to other areas.

An example of the experiential learning process is the use of 2-Factor authentication for technological devices (2FA). This security measure has become more commonplace for identity verification, and the experience of it is generally recommended for email accounts, financial transactions, social media applications, gaming services, and online shopping [8, 9]. Instead of using just one factor, such as a password, to protect information, there is a second factor to prevent others from unauthorized access of information [9]. A person could buy a VR headset that requires an account with 2FA. For the experiential learning process, the individual experiences 2FA and makes notes about the information included in the authorized security measure. He or she could find that there are many ways to authorize access to an account such as a phone, email, code verification app, and digital fingerprint. He or she thinks it is a great idea to use the digital fingerprint and email options, but he or she needs to verify these options to make sure they work. By going through the 2FA steps, he or she finds out that he or she can only complete the email step and must use his or her phone number instead of the fingerprint because his or her device used for 2FA is not compatible with the fingerprint feature.

From this hypothetical example, it can be observed that experiential learning conceptually recognizes there are motivators for experience, and they are used to solve existing conflicts within consciousness. Experiential learning theory also helps explain how VR can be used to enhance learning since its focus is on experiencing phenomena both directly and indirectly. The tie-in to the real world depends on what needs to be learned and who needs to learn it. It is possible for a real-world scenario to be created and selected based on what needs to be experienced, rather than being based on environmental factors and contexts outside of one's control.

Although VRLEs are in demand, the extent to which an

experiential method of learning has an influence on engagement, retention, and effectiveness is unknown. There have been empirical studies on the topic, but it needs more extensive investigation to determine how it applies specifically to criminal justice courses. A concurrent mixed methods pilot study was conducted to determine the following: How do students view the use of VR during and after criminal justice activities? To what extent are students familiar with VR-based environments during educational instructions? Are there any features of VRLEs that tend to increase student engagement as a whole?

2. Related Framework

Experiential learning is inspired by ideas within constructivism, psychotherapy, humanism, and participatory learning[6, 10]. The idea of experiential learning is frequently credited to Kolb[11]; however, there are other theorists, such as Dewey, who have contributed to its development. The experiential learning model is a four-step, cyclical process focusing on individual insights on what happens in the real world[7, 12, 13]. The subject plays a role of participant and observer during this process, and the steps help the individual in making decisions based on what is most appropriate for development[10]. These steps originate from the fact that an individual must resolve two major continua existent within all experiences[10]. The first involves the extent to which an individual needs tangible or analytical experiences, known as the concrete-abstract continuum. The second focuses on the extent to which experiences need to be observational or experimental, which is the reflective-active continuum. Comparisons to other theories are shown in Figure 1. In **Figure 1**, there are three important areas of comparison: (1) who drives introduction to concepts, (2) how a person explores relevant ideas, and (3) what activities students participate in according to philosophy. In experiential learning, a student encounters a phenomenon that must exist in the real world. The student engages in self-reflection and observation for exploration. Experimentation and assessment are activities that would help with experiential learning in addition to the other activities stated. Learning would be student-centered, but there could be some teacher guidance. It would not be as obvious as direct instruction, but it would not be as hands-off as constructivist-based exploration.

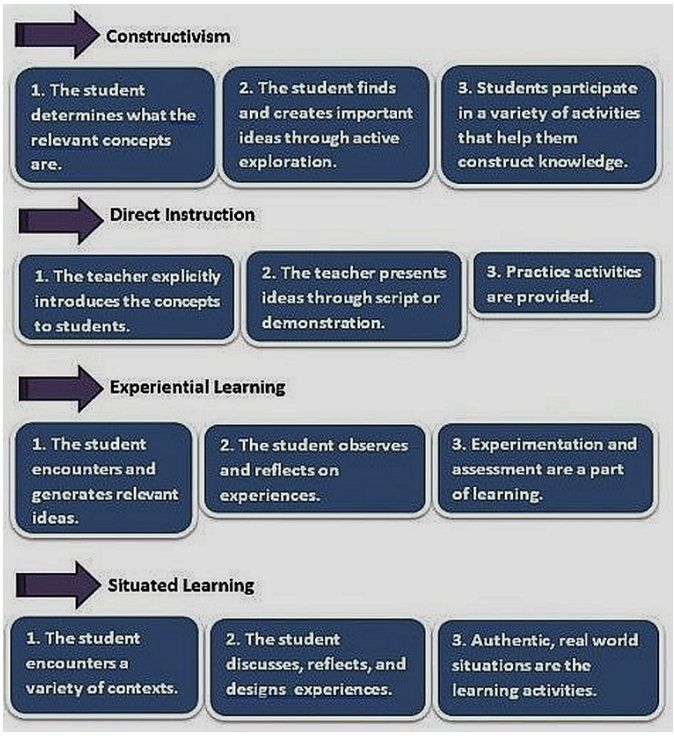


Figure 1. Step-By-Step Comparisons of Constructivism, Direct Instruction, Experiential Learning, and Situated Learning. The Most Teacher-Centered Instructional Philosophy Would be Direct Instruction. The Most Independent Learning Would be Encouraged with the Constructivist Philosophy. The Most Collaborative Experience Would be Situated Learning. Experiential Learning Would Encourage Learning as it Should Occur in an Everyday Life Encounter, Which Can be Harder to Emulate but More Personally Engaging.

Experiential learning separates itself from all other theories listed in that students must witness and extract different aspects of reality from self, others, and the world. Certain experiences already exist, and students decide to examine an event from different angles to learn. The context only matters to the extent that it is relevant within the experience itself. Learning can only happen from what occurs in an environment, and it is a process that requires transformation through experience, specifically through feeling, watching, thinking, and doing[11, 14]. It is not about internal constructs (constructivism), external direction (direct instruction), or constructs that change according to situation (situativity). The focus is on what exists and what can be credibly experienced. Why is this important to mention? This limits definitions and ideas to the reality of the world. For something to be real, it must be experienced in the world. It must be witnessed and documented exactly as it is observed or perceived. It may or may not be deemed practical or reasonable, but it is certainly accessible to people in the world. The subject or phenomenon of interest cannot be fabricated or created from internal processes alone. It must be present in the real world or it cannot be experiential. If it cannot be described with the five senses in some way, then it is not relevant to experience or to real-world learning. It does not depend on context to be seen, heard, touched, tasted, or smelled. A simple example of this would be money. Money exists in the world. There are people who may not use money to accomplish a task, but money has been observed in the world, at certain points in time and for certain purposes. A person can observe money, reflect on money, and discover money. However, inventing money based on an experiential point of view would need to be based on something already here that could be experimented with and assessed. It could be a real-world problem, a system of currency, or activities involving the concept of money. The actual presence and explanation of money would depend on the learner in terms of how money is practically encountered or discovered. Recognition of money would only be relevant according to how it is described within that instance. A person does not have to recognize that money can vary in perspective and situation if there is no evidence to indicate the need for such a discussion. This means if someone lives a very isolated or bubble-like existence in the world, then the world experiences and documentation of such experiences would likely be limited. If playing Grand Theft Auto V on a PS5 is the primary experience an individual has with money, then that is the most valid experiential learning tool for the individual, even if its use is limited in the real world. A gaming experience is still an experience that happens in the real world, and it is facilitated through user applications. With the use of technologies such as VR, limitations can be overcome so that students have experiences with concepts in such a way as to make them more accessible to learners. Essentially, VR is a method of transport to a situation of interest[15].

Furthermore, the experiences that students have in the world may be preplanned according to interest, or they may be random encounters within a particular area. The desire for equilibrium is something that was also espoused by Piaget, and the need for active experience is something that would be agreeable to constructivists overall. What separates this from constructivism is a recognition of detachment as part of the learning process. Reality is more than participant discovery, and reality can exist aside from the learner. There is constructive organization of ideas that takes place as well as inquiry-based learning, but it is considered part of a larger whole. Radical constructivists would likely have a problem with the structure of Kolb's process, seeing as they view reality as what the participants create for themselves based on their current skills and biological capacity[16, 17]. In experiential learning, a person can enter any step in the learning process; however, authentic learning only occurs when the four-step cycle is followed and all four steps are complete. Although not generally recommended, it is possible for someone to not follow the stages in the exact order as outlined. For instance, one could generate abstract processes and theories first, but then they would need to assess or experiment, then concretely experience, and then either note or observe the experience. While this learning philosophy accounts for different learning styles, it would not advocate for going outside the recommended process. Constructivists, on the other hand, would be more encouraging of people inventing their own learning processes, which may or may not conform to experiential models. For a constructivist, what works is determined by how an individual defines and organizes success, which may clash with the expectations and standards present in the real world. Also, the unique organizational processes of an individual's experience may

not necessarily follow the organizational pattern developed within the experiential learning model. If there are others who participate in the same real-world experience, the generalization process would focus on trends and themes that are similar in nature. This would place the focus of learning not within the learner but outside of the learner. Figure 2 shows a decision-making flowchart concerning various theories of learning. For experiential learning, an individual can encounter both student-centered and teacher-centered learning situations. Experiences can exist with a group or without one. It is possible to have an independent experience and an interdependent experience at the same time. In **Figure 2**, there are two needs where experiential learning is emphasized: (1) the need to let students encounter something in the real world, which may or may not be planned and (2) the need for a real-world tie in that is dependent on a learner's circumstances. An example of this would be limited access to a wireless network. How something is documented would vary according to technological access. If a student does not have a way to connect to the internet, this could limit the amount of learning experiences only to what is tangible.

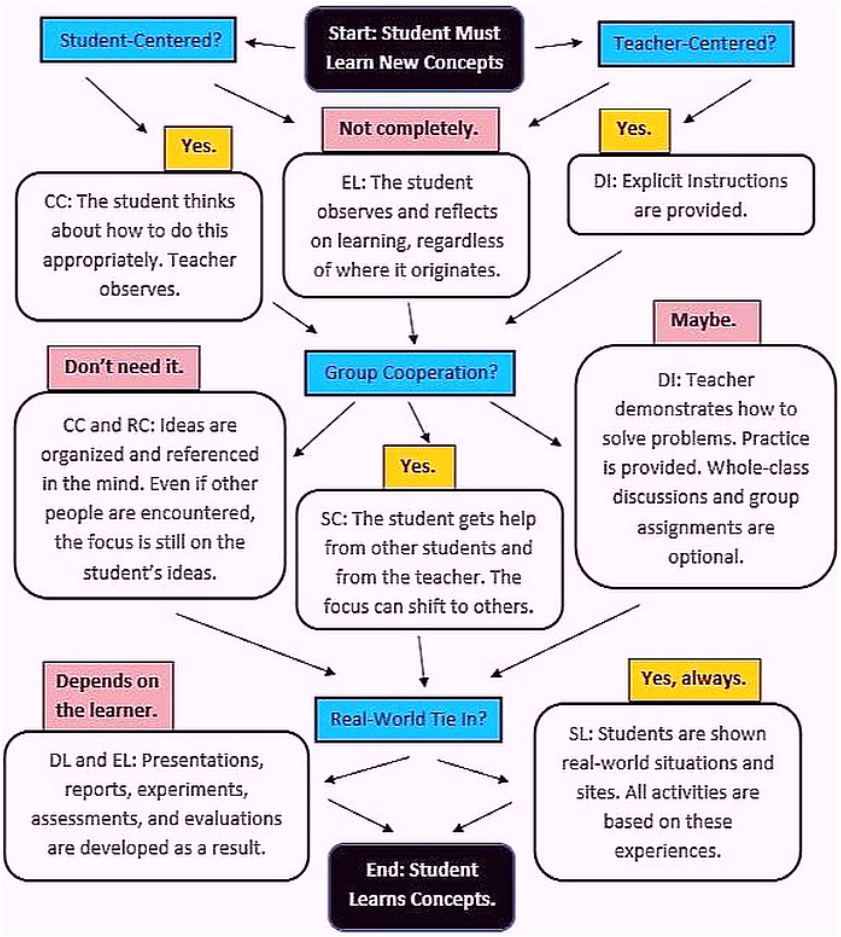


Figure 2. Flowchart Outlining Key Decision-Making Areas Concerning Various Frameworks for Learning. CC = Cognitive Constructivism, EL = Experiential Learning, DI = Direct Instruction, RC = Radical Constructivism, SC = Social Constructivism, DL = Discovery Learning, SL = Situated Learning. It Is Possible for Teachers to Use Multiple Teaching and Learning Theories to Enhance the Learning Environment; But There Are Certain Tenets That Would Allow Teachers to Lean More Toward One Strategy Even Though Multiple Strategies Could be Used.

Consequently, the experiential learning model does encourage the use of simulations and career-based experiences, both traditional and nontraditional[13, 18, 19]. For instance, students could go on virtual and face-to-face field trips to organizations that specialize in computer programming, educational science, engineering, and gaming technologies to find out more about virtual worlds and the skills needed to create them. There could be group training sessions for stu-

dents where journaling and notetaking are required during events. Students could participate in science fairs and presentation projects to assess what they have learned about the world around them. Ultimately, the purpose of experiential activities is to help individuals address areas of development need for themselves. From that information, they can determine the resources essential for their overall personal development[13, 20].

Empirical Examples of Experiential Learning Within a VLE

Within experiential learning, students encounter various situations and reflect on what they are shown. They brainstorm possibilities, conduct experiments, and are tested to ensure they have learned all intended concepts. VLEs can provide these transitional encounters but do so in a safe, controlled environment. An example of this can be found within a study conducted by Bossavit et al.[21]. Students in primary and secondary schools encountered Virtual Museum (VM) gaming applications during their tour of Oteiza's museum. They learned information for personal reflection and group sharing. They gave important feedback about their experiences and tested the games developed for various sculptures in the museum. From the data collected, the researchers and evaluators concluded the following: (a) the mini-games helped students learn, (b) girls were more likely to be engaged than boys, (c) active learning and group activity participation does not guarantee success, and (d) participation in independent learning activities can help students increase comprehension and knowledge.

A more controversial example of how one can use virtual learning within an experiential context is provided in a counterbalanced research study by Sil et al.[22]. In this study, 62 children played Sonic and the Secret Rings on the Nintendo Wii with a wireless one-handed controller. The children had to experience different situations for themselves, mentally reflect on each condition, learn about new gaming environments, and test out virtual products. Pain tolerance from a cold pressor was measured over time, and it was found that the children had a significantly higher pain tolerance when comparing the use of gaming and VR conditions to the baseline. When comparing the two gaming conditions with each other, no significant differences were found.

Like the directed learning approach and social constructivist approach, the experiential learning approach can use virtual learning activities to improve job competence and social skills. Burke et al. used a Virtual Interactive Training Agent (ViTA) to help students with autism spectrum disorders improve career-based skills through interview simulations[23]. Unlike Smith et al.[24], who completed an interview study that focused mostly on modeling interviews in a simulation and tying participants' results to future outcomes in the real world, Burke et al. included more about the interactive process that took place with adult participants[23]. In other words, the actual experience and choices of that experience were emphasized by Burke et al., which would be less prescriptive and more practical[23]. Features of the customizable options were available to address a variety of interview questions and contexts. Results from multiple instances of the Marino Interview Assessment Scale (MIAS) showed significant improvements in interview and self-assessment skills overall.

Another study pertaining to career competence and social skills was implemented by Dyer et al. in order to measure empathy and comprehension in medical students at the University of New England[25]. The students experienced first-person VR modules created by Embodied Labs. The study demonstrated that students did improve their understanding of the aging process and age-related diseases. They also became more empathetic with those who had to experience such conditions as macular degeneration, hearing loss, and Alzheimer's disease. It was suggested that VR headset exposure in labs should be limited to 10 minutes per session with breaks in between sessions so that students do not experience adverse side effects (e.g., nausea and dizziness).

Finally, there are studies that do explore virtual reality specifically within the area of criminal justice. For instance, van Gelder mentions how there are studies on virtual burglary[15], such as the Virtual Burglary Project (VBP), where participants commit burglary within virtual environments. Participants are often incarcerated individuals, but other groups have been used to establish patterns of behavior when committing crimes. The decision patterns of expert burglars in a simulated environment are compared to decision patterns in real-world environments. The research has shown that certain locations are more likely to be robbed than others, and strategies for entering a house may vary according to criminal expertise. Having guardians who could potentially intervene

during crimes is a deterrent of burglaries. Additionally, Smith et al. conducted a study on VRLEs in criminal justice where 242 undergraduate students from five criminal justice classes looked at 360-degree videos and filled out a survey based on their experiences [26]. Though survey research is usually viewed as a quantitative method, it was used for qualitative purposes. Results showed that VR experiences in the videos elicited strong emotional reactions, encouraging more connection, learning, and engagement with the materials and resources used within the classes. Three themes were generated from the response data: personal connections to materials, empathy for others, and emotional responses to situational factors. The participants connected the experiences viewed to their own experiences. There was more emotional relatability to others after the videos were presented, and responses were affected by what was physically present or absent within the video environments. A third empirical example can be found within a review study by Meenaghan and van Sintemaartensdijk [27]. The aim of the study was to determine how XR was used in the areas of criminal justice education and training. The data indicated six different activities from the studies they found, ordered from most used to least used: crime scene simulations, cybercrime investigation, interviewing, police operational training, offender profiling, and risk assessment. The activities allowed for more practice, connection, and understanding about possible situations that are likely to happen within real-world experiences.

3. Materials and Methods

A pilot study was developed in Summer 2019 for a higher education classroom lab in the United States. Permission was obtained by Valdosta State University to implement the procedures of the study. A concurrent embedded mixed methods study was created to answer the research questions. Concurrent designs collect and analyze different forms of research at the same time [28]. Participants were selected according to certain criteria: (a) participants were from 18-24 years of age; (b) participants were majoring in criminal justice at the time of the activity; and (c) participants were currently enrolled in a criminal justice course. More demographic information is provided in **Table 1** [29]. Observations and surveys were used to collect data during lab time with the VR-based intervention. Demographic data, participant frequencies, and percentages were collected in terms of the quantitative aspect of the study. Student responses and teacher observation notes were collected for the qualitative aspect of the study.

Table 1. Demographic Information. Adapted from Ticknor [29].

Frequency	Ethnicity	Percentage	Cumulative Percentage
23	African American	57.50%	57.50%
4	American Indian/Alaskan	10.00%	67.50%
12	Caucasian	30.00%	97.50%
1	Hispanic/Latino	2.50%	100.00%

There were 40 students who participated. Most students ($n = 23$) were African American. There were 21 males and 19 females who participated during study implementation. Approximately 50% were able to adequately use computer technology before the study occurred. Approximately 60% were comfortable using mobile phone technology, and approximately 33.33% had prior experience with VR. VR lab simulations were used to help students increase their knowledge about the following topics: Use of force and de-escalation, Workplace stressors, Cognitive behavioral treatment, Family social support networks, and reentry services. The students put on Canbor VR headsets to experience the environments. They looked at real life, everyday situations with the headsets that addressed experiences within the scope of criminal justice. For instance, an active shooter simulation was used to discuss use of force and de-escalation. Meditation apps addressed workplace stressors. Mock offender treatment groups addressed cognitive behavioral treatment, family social support networks, and reentry services. The experiences they witnessed in VR were not just simulations that demonstrated particular activities. For most of the participants, they were moments to remember [29, 30]. Some of the emotional, eye-opening experiences included the following:

The experience of solitary confinement.

Wrongful conviction through the eyes of a child visiting an imprisoned parent.

Wrongful conviction through the eyes of an incarcerated individual.

The process of imprisonment and treatment concerning imprisonment.

The support or lack of support present for those incarcerated.

Observations were gathered at the beginning and middle of the VR activities. A survey was administered after the activities occurred but during the same lab session. The participants and the professor at the time of instruction completed the survey. This was done to make sure all possible experiences were accounted for, from the perspectives of the students and the perspective of the teacher. The items addressed (a) previous technology use, (b) problems experienced during simulations, (c) content opinions, (d) concept perceptions, (e) willingness to use technology in the future, and (f) additional comments. After data were collected within the instructional block of time allotted, data were analyzed with Microsoft Word and MAXQDA. Data consisted of frequency counts, percentages, demographic descriptives, answers to survey questions as well as notes and quotes made during the observation process.

4. Results

The results of the study were positive overall. The observations revealed that students effectively gained understanding of each topic. They were engaged throughout the activity. Some of the students verbally commented about the use of gaming and VR in the learning environment. Survey results indicated they were more engaged with the VRLE-based instructional content, which was not present in previous classes. There were over 90% of participants who said the simulations were of good or excellent quality. There were about 60% of participants who said the simulation moderately increased their knowledge, and 30% had a significant increase in knowledge[29]. Experience satisfaction was seen with over 72% of the survey responses, and nearly 82% would recommend VR technologies for classroom learning. The issues that occurred during implementation were time and content related. The students needed more time to get the most out of the experience, and not everything within the topics was sufficiently covered during the simulation activities. There were no notable differences in gender or ethnicity in reaction to the VR experience.

There were many reasons given as to why the use of VR simulations was a good thing. The primary reason given was that it helped students interact with cultural issues. For instance, two of the participants tied their experiences with race and culture. During instruction, one participant said that this VR experience "could change how we see racism." Another also said the activities would be useful for "the interaction of culture and development in the world." The secondary reason was that students were able to get in touch with their emotions. They experienced perspectives and feelings they had never experienced before this study. One student expressed that the experience of solitary confinement was an opportunity for unprecedented reflection: "It has made me really think about why we do this." Another stated, "I cried. I actually cried. That's a first." The emotional connection helped students learn more about their career choices and experiences of others within the criminal justice system. The third reason was that it was entertaining for those involved. The students wanted to share the experience with others or entertain themselves more with the experiences they had. This is evidenced when one student said, "Every student on campus must see this." Another student would later go on to say, "Can we get popcorn next time!" The level of engagement was present to the point where they would recommend the activities to others or participate in the experience again.

5. Discussion

For the participants in this study, the use of a VRLE in the criminal justice classroom was an engaging, experiential endeavor[29, 30]. They experienced events from concrete, abstract, active, and reflective standpoints. The students had a concrete experience with the Canbor VR headsets to immerse themselves in simulated environments that were based on real-world experiences. They had to make reflections and allow documentation of their experiences through recordings, pictures, questions, and notes. They generated reactions and explanations of why they enjoyed their VR experience. They had a chance to test VR and make suggestions for future exploration. For the students, the active experience is different from a passive lecture, a good suspense movie, or a detec-

tive novel. When someone retells an experience in their own words or comments based on their own feelings and thoughts, the individual shapes that perception. They are more than just their attendance, and they are not just a statistic. The problems in the justice system are not truly real to people until they have experiences like them in their own lives. If they hear it secondhand, it is a different experience than direct immersion. VR can help people be exposed to more experiences to make them aware of problems and possible solutions to those problems. Doing something about crime has to mean something first. People need to be motivated and engaged enough to want to correct the issues and pursue degrees to help correct the issues [1, 25, 29, 30]. An experience, in and of itself, can be that motivation. It can be the catalyst for more discussion, reflection, education, and research.

5.1. Significance of the Results

The VR experience within the study was meaningful for many students there, and it inspired them to further their education in criminal justice. There was no unusual pain, sickness, or symptoms reported. They found that the experience was something they would want others to have. There was more willingness to share and empathize with others, which supports findings within Dyer et al. [25]. When they were able to tie their experiences to something familiar, such as culture or motivating experiences, they were able to get more out of what they were doing. Although the reactions to the content were generally the same (i.e., positive), the way in which people made meaning out of the experience was different. One person can see an experience in a different way than another person, even though they both experience the same lab environment or the same type of VR equipment. The amount of learning can also be different. While most students affirm Kolb's idea of meaningful experiences needing the steps he recommends [11], there are two findings about student learning that should be noted. The first is that it is possible for someone to go through the process and not have a good or meaningful experience. In other words, a meaningful experience is not guaranteed. Academic learning gains, for instance, were moderate for 60% of people. They would not be considered significant for most students within the frequency count. Learning occurred for most but, from their perspective, it was not on the scale it would need to be to make a difference or significant impact. However, it can be said that everyone had a new experience concerning VR headsets and they all learned more about how to test, reflect, practice, observe, participate, and emotionally regulate in VR situations. There would be more meaning from the emotional or technical aspect than the academic because most would recommend others to have the experience and engage with it, even if all class content is not sufficiently covered. The results in this study that showed significant and meaningful experiences would be supported by Bossavit et al. and Burke et al. [21, 23]. The idea of making social, emotional, and empathetic connections is further corroborated by the results found in Smith et al. [26]. The second finding is that it is also possible for someone to engage in steps simultaneously. For instance, a student could go through a concrete experience with VR and generate ideas on how to solve problems in the VLE while still in the experience. They could be recorded while having the experience and this could be part of an assessment of their experience. Interactivity and learning could be formulated from various combinations of steps, which could be represented differently for different learning processes. Certain behaviors in terms of learning and acting within the VRLE became patterns of connecting, being, and doing that further strengthened the idea of the need to reform practices in the criminal justice system. The need for crime-based pattern recognition and authentic simulation of the real world is echoed by Meenaghan and van Sintemaartensdijk [27], Smith et al. [26], and van Gelder [15].

5.2. Suggestions for Research and Practice

While Kolb does emphasize that an experience can contain multiple steps [11], more needs to be explored in terms of the combinations possible for meaningful learning. This is crucial information for criminal justice reform. There is an ongoing need for more crime prevention and rehabilitation strategies. To find out what works within a virtual environment, more simulations must be made to determine how likely crime is committed in a given area, how people tend to commit crimes, how practice in simulations allows for mental wellness, and what safeguards can be put in place to reduce crime in the real world. Predictive modeling is encouraged as a research avenue when trying to determine patterns of behavior for a variety of circumstances. Having more mixed methods studies in XR would help to compare different methods of simulation (i.e., VR, augmented real-

ity, and mixed reality) in terms of effectiveness. Learning is not a one-size-fits-all process, and those who create VRLEs must practically acknowledge that different experiences may yield different results. Changes to the environment may change response and learning patterns for those involved if they feel the changes are significant. Giving students options on how to change the learning environment may also change the interactivity and control they feel during VR experiences. Consequently, Kolb did identify four learning styles according to learning preferences (i.e., accommodator, diverger, converger, and assimilator)[11], and these learning styles should be emphasized more in VR lab studies.

It is important to note that the four steps in the experiential learning cycle could be combined into one step with four parts, or a ratio can be used to explain the dynamic of 4 in 1 or 4 to 1. The author conducted previous research on classroom incentives that included the use of a 4:1 reinforcement system, where every 4 good behaviors exhibited by students would receive 1 point or coin[31]. Those points or coins were exchanged for prizes, and there needed to be at least 4 to receive a prize. There were also tests where if all students passed as their average score, then they could receive four coins or points depending on the incentive system at the time of the test. The study the author conducted was for middle school learners in mathematics but could be modified for use within criminal justice classes. The use of incentives in VR within higher education is not unfamiliar territory, but directly relating to an experiential process does require future research as most incentive-based studies in reinforcement involve schedules that have more behaviorist leanings. Behaviorism can have negative connotations in academia, so tying incentives into experience or experience construction would be more conducive to the current academic situation of learners today. In terms of experiential learning, this 4:1 ratio can be modified to encourage four positive experiences or learning strategies within one academic learning session. A certain amount of learning achievements or behaviors could be required.

From a practical standpoint, VRLEs have demonstrated benefits in terms of communication and emotional exploration. Having more exposure to problems in society allows for more opportunities to reflect, observe, test, and change perspectives concerning criminal acts, incarceration, and reentry. More awareness encourages more sustainable ideas for change as well as more people involved in what happens each day, to the point where more understanding can take place that facilitates making a difference in the lives of those affected by criminal activities. Another practical possibility in terms of modifying the learning experience is to have team situations within games, where there are teachers in teams or students in teams as a requirement of the VR experience. It could then be compared as to whether shared experiences help students comprehend key concepts, ideas, and strategies more than, less than, or about the same as individualized experiences. Having an option of group participation or simultaneous viewing could help it be more customizable. The reflections and documentations of such experiences can provide an additional level of insight on how students make the most out of the experiences they have by themselves and with others. It is unclear how a shared experience could impact responses or perceptions of meaningfulness.

5.3. Limitations

Finally, there were a few limitations concerning this study. The results were limited to the students and professors who experienced the simulations firsthand. It is unclear what the reception of the activities would be in other classrooms, states, or countries. The results of the study are applicable to all participants, but they lack generalizability. In terms of transferability, the results would only be applicable to similar situations in the academic setting. It is possible for other classes to benefit from the use of virtual experiences pertaining to criminal justice, but how that varies from subject to subject has yet to be determined. It is unclear how online students would view the VR experiences or if they would have a similar reaction to those who participated in the experiment in person. Possible differences between online learning and in-person learning need to be explored. There were also cost, space, and time constraints where students could not learn or do everything possible. More research is required to determine the inferential implications of such research from a statistical point of view as well as the rate of engagement that students would have if exposed to VR simulations on multiple occasions. Descriptives were captured to provide a general overview of the backgrounds of the participants, but more in-depth statistics are encouraged to provide comprehensive coverage of what occurs before,

during, and after the learning process. A certain level of expertise is required to set up and operate the equipment, and more prior knowledge about VR helps to address any unanticipated problems concerning the simulations.

6. Conclusions

A mixed methods pilot study was created to determine if VRLEs could be used for engagement and instructional support within higher education. Forty participants experienced simulations about important issues in the criminal justice system. Most students found the simulations to be culturally relevant, emotionally interactive, and entertaining. This experience is recommended for more students and for future research designs. While it is unclear how these simulations would perform in multiple classrooms, it is apparent that combining VRLE use with an experiential learning paradigm shows promising results in the right circumstances. This study's process and the findings do give direction on what can be focused on in terms of learning, student development, and emotional connection. Future studies with a similar implementation design are needed for deeper exploration of VR and its potential within higher education classrooms.

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Institutional Review Board Statement

The study was conducted in 2021 in accordance with the Declaration of Helsinki, and it was approved by the Department of Sociology, Anthropology, and Criminal Justice at Valdosta State University (VSU Virtual Labs). Dr. Bobbie Ticknor provided oversight for the study and its approval.

Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

Data Availability Statement

All data needed for this study are provided in the article, but a presentation of the study has been referenced as Ticknor. There was also a news report article that contained pictures of the study, which is cited as Morejon.

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Conflicts of Interest

The author declares no conflict of interest.

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