Modifications of Project-Based Learning to Fit Students with Adverse Childhood Experiences

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Abstract

The purpose of this qualitative case study was to explore the perception of modifications necessary as educators moved away from a traditional learning environment with little movement and high academic stress through the introduction of project-based learning activities specifically for this population of students. Data were collected from 1-1 interviews with five participants teaching within a mental health residential school in Missouri who hold Missouri teacher certification ranging from elementary to high school level working with 175 students, ranging in ages from 8 to 17. Additional data were collected from lesson reflections and lesson plans from classrooms of students with the same background as teacher participants over the last four school years, 2018-22, of teachers who have taught project-based learning units. Interviews, lesson reflections, and lesson plans were manually coded twice and then coded a third time using electronic coding via NVivo to ensure bias from myself was not present. This study supports using project-based learning activities with students across grade levels from elementary to high school who have encountered adverse childhood experiences. Findings from this study support perceived modifications to generate curriculum options that are non-traditional as well as relevant to students within a residential care facility school.

Keywords: adverse childhood experiences, project based learning

1. Literature Review

The focus within the residential school dealing with children and teens with mental health and behavioral issues and finding a curriculum that can positively impact students with adverse childhood experiences (ACEs) was the catalyst for this study. The purpose of this study began as a quest to discover a curriculum framework that would complement Dr. Perry's Neurosequential Model of Education (NME) approach to regulating students (Hambrick et al., 2018; Hambrick et al., 2019.). The Neurosequential Model of Education emerged through Dr. Perry's unique approach to studying trauma's impact on the developing brain. Dr. Perry created NME not as an intervention or outcome measure but as a research-based concept to aid educators in creating a safe learning environment for children who have a history of ACEs using the concepts of regulate, reason, relate (NME core concepts and trauma-informed practices, n.d.; E. Hambrick, personal communication, April 7, 2022).

Over 20 years ago, Felitti et al. (1998) conducted research that noted a relationship between ACEs in childhood and academics and health issues in adults. As a result, the term adverse childhood experience or ACEs had included any negative, traumatic, or stressful event a child encountered. Abuse, including physical, emotional, or sexual; neglect both physical and emotional; incarceration of an adult family member, divorce, mental illness, substance abuse or alcoholism; parents separating; poverty, bullying, community violence, and discrimination was added to ACEs questionnaires through continued research (Cronholm et al., 2015; Finkelhor et al., 2015; Portwood, 2018).

Children exposed to ACEs often become caught in an impulse-response mode due to an inability to process content using executive functioning skills (Erol & Karaduman, 2018; Ferrero et al., 2021; Hambrick et al., 2019). Due to the lack of executive functioning skills and limited ability to self-regulate, students with ACEs often have behavioral problems that further disrupted learning and the potential for academic success (Banyard et al.,2017; Erol & Karaduman, 2018; Hambrick et al., 2019).

Over the past 20 years, the focus of what it means for a student to be ready to learn shifted from academic skills to include a student's social, emotional, and behavioral skills. Research supports moving away from traditional learning

environments, which offer little movement and minimal collaboration while pushing high academic stress (Redford & Pritzker, 2016). While project-based learning (PBL) has been studied to show how instructional practices can be an effective means to increase academic achievement (Lee & Blanchard, 2018; Study International Staff, 2019), there is a gap in literature noting modifications necessary for neuroatypical students and project-based learning as well as modifications necessary for students with ACEs.

The problem is traditional learning environments that offer little movement and high amounts of academic stress do not work well for students who have encountered ACEs, as evidenced by an apparent link to separation anxiety, oppositional defiant disorder, impulse control, attention issues, acts of aggression, as well as difficulty navigating relationships with peers and adults (Ford, 2017; Uzezi & Jonah, 2017; Van der Kolk, 2017). Students with ACEs have an increase in their fight or flight reactions and can often appear on edge due to the stress academic situations place on their brain and body (Taylor et al.,2018; Terrasi & de Galarce, 2017).

2. Results and Discussions

Research Question

What are educators' perceived modifications necessary for project-based learning activities for students ranging from 8 to 17 with ACEs?

Project-based learning (PBL) conceptual framework outlining social interaction and hands-on learning appeared to blend with Dr. Perry's regulate, reason, and related framework. Moving from the bottom of the brain to the top of the brain, a dysregulated child can be supported in regaining control (Day et al., 2017; Hambrick et al., 2018; Hambrick et al., 2019; Jazulie et al., 2020). It is important to note that the formula regulates, reflects, and relates does not have a set formula, and teachers can move between different perspectives as determined by the child's regulation (Hambrick et al., 2019; Jazulie et al., 2020). One of the key concepts within Problem Based Learned allowed students to show mastery of academic skills through the use of real-world projects (Jazulie et al., 2020). Using PBL, teachers began by regulating students as they used academic skills they had already mastered while giving students the freedom to complete rhythmic activities such as moving desks, carrying materials, and working with the same peers. Furthermore, using the framework of PBL, teachers are further able to create a structured environment which is also a key concept within regulation in NME (Keels, 2018; Koh, 2020).

Participants of the present study all work within a residential classroom located in mental health facilities throughout Missouri. The predominant educational diagnosis in the program is Emotional Disturbance; however, roughly 45% of students have an educational diagnosis of Other Health Impaired, Multiple Disabilities, Learning Disabled, and/or Speech-Language Impaired (Great Circle, 2019). Additionally, 20% of students have mental health concerns such as bipolar, schizophrenia, multiple personality disorder, and/or depression (A. Montoya. personal communication, January 17, 2022; D. Jones, personal communication, January 17, 2022; Great Circle, 2019; E. Rackers, personal communication, January 17, 2022).

Covid-19 restrictions noted limitations in lesson plan reflections. Teachers noted challenges relating to virtual learning and students who did not have internet access or who had software issues. During the first part of the 2020-21 school year, several teachers conducted classes virtually due to COVID exposure and quarantines, limiting their perception of PBL activities. Moreover, quarantine of student groups also disrupted lesson flow, groupings of students, and the requirement of six feet of separation impacted collaboration on PBL, as noted in several lesson plan reflections. Furthermore, national staffing shortages resulted in the need for regulation staff to step into classrooms to aide teachers, limiting regulation logs and notes from late March of 2020 through December of the 2021 school year.

Within this present study, there is a potential for bias, due to my personal experience with students with ACES and have used PBL in my classroom both within a mental health facility and a public school. Therefore, an internal audit and peer debrief of analysis techniques and themes and member check of interview questions was conducted to overcome personal and participation bias. These discussions encouraged the sequencing of methods and helped articulate the rationale of the findings.

This present study work was carried out under research specific to an applied educational doctorate of Northcentral University (National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, 1978). I conducted this research to complete an applied educational doctorate and received no compensation for this research. I have worked for the last seven school years within a school setting set within a mental health field, specifically with students aged 8 to 14 who have multiple ACEs. Working in this field I noted a positive relationship between PBL and decreased negative classroom behaviors specific to my classroom. Furthermore, I, as well as study participants, have extensive training in trauma-informed practices. This training needed to be noted as all participants and lesson plans used will need to be identified within this study reflect research to PBL activities through a trauma-informed care lens or practices.

The study received approval from Northcentral University's Instructional Review Board before data collection. Site approval was also required. A written proposal was submitted to the Senior Leadership Executive Teams of the site, and approval was given on 12/8/2021. Participation in this study was voluntary, and no compensation was given. Participants signed a waiver outlining involvement needs.

Confidentiality was ensured as all names were removed, and codes were assigned to participants before peer debriefs and analysis. Interviews were transcribed and reviewed by the participant to ensure no misinterpretation by myself before coding and peer debriefing. Before peer debriefings, the material was typed for clarity, and each peer reviewer was assigned a different color to code.

The study population was drawn from 50 teachers, 55 teacher assistances, 5 regulation coaches, 4 instructional coaches, 7 directors of special education, and 10 educational therapists who work within the mental health field in residential schools with approximately 500 students ranging in age from 5 to 19, with specific behavioral needs and have experienced ACEs throughout Missouri, Kansas, and Illinois (Great Circle, 2019; Great Circle: Our School, 2021). Teachers within the autism school could not be included as this program was shut down in late 2020.

Data were collected from interviews with five participants who represented a sample of educators who teach students aged 8 to 17 within a mental health residential agency in Missouri. Table 1 shows the demographic breakdown of the mental health residential agency educational employees and students served over the last five years. Table 2 shows a demographic breakdown of the five interview participants. Ethnicity was not included in Table 2 as a means to protect the identity of participants.

Table 1. Demographics of Residential Mental Health Education Facility and Students

		17-18	18-19	19-20	20-21	21-22
Faculty Full Time Employees	Men	65	54	57	63	54
	Women	121	114	116	123	95
	Total	193	168	173	186	149
Number of Students	Boys	219	223	227	229	216
	Girls	109	110	113	116	102
	Total	328	333	340	345	318

Table 2. Demographics of Project-Based Learning Teacher Interview Participants

Participant Number	Gender	Student Taught at Mental Health Residential Facility 2017-2022	Years of Experience with PBL with students with ACEs
1	Male	39	20 years
2	Male	61	5 years
3	Male	60	8 years
4	Female	41	3 years
5	Female	56	2 years

Teachers who choose to participate had a minimum of monthly training beginning in August 2021 and continuing monthly, which will be at least seven months, August 2021 through April 2022, of training in Dr. Bruce Perry's Neurosequential Model of Education (NME) and additional training in regulate, reason, and relate techniques also known as trauma-informed training provided by the mental health facility before participation in this study. Trauma-informed training was conducted monthly every year of the study began in August and continued through May 2022. Additionally, each teacher had an established regulation area and regulation protocols before participation in the study.

In this research study, participants are assumed to have received at least one year of trauma-informed care training. Long-term staff members of the residential classrooms are considered experts in dealing with students within a residential classroom. Teachers, teacher assistants, regulation coach, and educational therapist accept that student

behavior within a residential classroom can be characterized as lacking neurodivergent development, creating a need for a smaller teacher-to-student ratio. These class sizes are smaller than the traditional classroom and are often capped at a ratio of one teacher to five students. Additionally, it is assumed that participants will be open, honest, and truthful in their interview responses. Furthermore, lesson plans are assumed to reflect both positive and negative outcomes.

In addition to interview responses, I reviewed lesson reflections from the last five school years, 2017-2022, of teachers who had taught PBL units throughout the mental health agency's residential schools, which span six locations throughout Missouri. Project-based lesson plans were found using the mental health agency's TEAMS site. Once a data agreement and IRB approval were obtained, I could view each site's folders.

Demographics of Project Based Learning Lessons by School Level and Year

School Level	2017-18	2018-19	2019-20	2020-21	2021-22
Elementary	1	2	5	7	8
Middle	1	2	10	4	5
High School Boys	1	2	4	3	5
High School Girls	1	1	5	6	2
Autism	0	2	1	n/a	n/a

During the fall of 2020, the decision was made to discontinue school services for the autism unit within the residential mental health facility. Due to this decision and school services being discontinued by January 2021, there was no lesson plans to be reviewed for this subcategory after the 2019-20 school year. Within the other school levels, there could be additional students with autism; however, this information was not listed within the lesson plans or reflections and therefore could not be noted. Lesson plans specifically stated high school boys or high school girls; thus, it was necessary to make this distinction. This distinction was not considered when reviewing teachers perceived need for modifications.

Lesson plans were pulled from the company server and reviewed, looking specifically for PBL units. From PBL lesson plans, I recorded the unit's length, instructional strategies, modifications, depth of knowledge covered, activities, means of assessment, and reflections, specifically noting student progress, strategic adjustments, and regulation techniques. Member checks were conducted to ensure the accuracy of raw data. From this data, I reviewed perceived changes in self-regulation techniques and perceived instructional strategies specific to working with students with ACEs. I also use check sheets to tally modifications used during instruction. Three field testers with backgrounds in PBL and curriculum development or assessment participated in a peer debrief via email due to one field tester living out of state to discuss calibration in instructional strategies, modifications, activities, and strategic adjustments. During this peer debriefing, I noted any calibration issues, such as modifications made in one subject or classroom and not documented on other lesson plans.

A check sheet was prepared to identify modification used and frequency of use within each PBL unit and activity and compared across classrooms. The check sheet allowed for identifying frequency, occurrences, and the total number of modifications used. The type of modification was listed, and a tally was given each time the modification was included in a lesson plan.

Academic Modifications by Grade Level

Modification	Grade Level	Subject
Give oral cues/prompts	Elementary Middle	Reading, History, Math, English Language Arts, Science
Directions are given in a variety of ways	Elementary Middle	Reading, History, Math, English Language Arts, Science
Avoid penalizing for penmanship	Elementary Middle	Reading, History, Math, Science
Group Activity (minor group completion of questions	Elementary Middle	Reading, Math
Extended time to process answers	Elementary Middle	Reading, History, Math, English Language Arts, Science
No Error for Spelling	Elementary Middle	Reading, History, Math, English Language Arts (unless grading for spelling), science
Provide positive feedback	Elementary Middle	Reading, History, Math, English Language Arts, Science
Small group instruction based on instructional need	Elementary Middle	Reading, Math
Extended time for completion	Middle	Reading, History, Math, English Language Arts, Science
	High School	Electives, English, World History, Health, Personal Finance, Government, Science, Math
Use weekly grade checks	High School	Electives, English, World History, Health, Personal Finance, Government, Science, Math
Frequent reminder of rules	High School	Electives, English, World History, Health, Personal Finance, Government, Science, Math
Verbal assistance	High School	Electives, English, World History, Health, Personal Finance, Government, Science, Math
Written Cues	High School	Electives, English, World History, Health, Personal Finance, Government, Science, Math
Visual Presentation of directions	High School	Electives, English, World History, Health, Personal Finance, Government, Science, Math

Coding was conducted using the following method for all interview questions responses and lesson plan reflections. Manual coding was done twice over approximately two weeks, with one week between each manual coding session. I began with deductive coding, as Linneberg and Kargaard (2019) outlined. To generate deductive codes, I first reviewed themes noted in my literature review, explicitly using cognitive development, brain development, social learning, academic engagement, student engagement, behavioral impact, and feeling safe. I also used commonalities identified in interview questions, engagement, regulation, and implementation. I then broke down each of these more extensive codes into an evaluation and thematic analysis (Calrke & Braun, 2017; Gibbs, 2018; Saldaña, 2021) to note specific trends in the teacher's perspective relating modifications and move them into categories. Using thematic coding or thematic analysis, I was able to find themes in sentences and paragraphs by analyzing the meaning, structure, and syntax of words. Thematic coding also allows me to generate frequency charts quickly (Clarke & Braun, 2017; Gibbs, 2018).

The second round of manual coding were conducted approximately a week after the first round of coding, I used pattern coding to condense large amounts of data into smaller analytical units to assist in identifying categories and themes (Saldaña, 2021). During this coding round, I looked explicitly to place items into patterns relating to modifications relating to special education and specific to PBL activities; these phrases included engagement, frustrations, behavioral changes, and regulation both by the teacher to the class and individually. Along with manual coding, electronic coding was applied via NVivo software was used to generate themes and ensure my bias was not reflected in the generation of codes and themes to be analyzed. NVivo auto-generated themes and first-round and second-round manual coding were compared to see how well each code aligned (Saldaña, 2021).

Research Process

What are educators' perceived modifications necessary for project-based learning activities for students ranging from 8 to 17 with ACEs?

Interview responses, lesson plans, lesson plan reflections, behavioral logs, and regulation logs were reviewed to help answer research educators' perception of necessary modifications specifically for students ages 8 to 17 who had experiences ACEs. In addition, by analyzing and coding multiple data sets and contributing to the credibility of the findings, I provided a fresh perspective as an outsider who was not directly engaged with each lesson or the method of modification employed.

Specifically, I began by reviewing lesson plans for the last five school years, 2017-2022, reviewing modifications only. Coding for modification usage included noting if they were for academic or regulatory purposes. Starting in November 2017, I noted modifications listed included academics only. I did break down modification by elementary, specifically second through fifth grade, middle, sixth to eighth grade, and high school, including ninth through twelfth. In addition, lesson plans for one region broke down the high school by gender; however, other regions did not include this information. I did not include gender as a factor in lesson plans and grouped all high school lesson plans.

In 2017, academic modifications across all levels were generalized and often stated "specific to individual IEP needs." For example, the elementary and middle schools included extended time, frequent breaks, and no penalization for spelling errors if the spelling is not graded. This pattern of modifications was similar across regions. However, in the Fall of 2018, there was a change in modification as teachers were given Missouri Department of Elementary and Secondary Education (DESE) Form F: Classroom Accommodations and Modifications. The use of Form F was listed on several lesson plans as a reference. In reviewing lesson plan reflections, there was a perception across grade levels that teachers were using common modifications; however, they were not explicitly listed. Adding the use of a state document from a department of education not only increases the credibility of the modifications used but also increases transferability as any teachers within Missouri who work or have worked with the IEP process would be familiar with these modifications.

In reviewing lesson plans for the fall of 2019- 2022, I noticed either none or digital copy listed for most lesson plans. In a personal communication with one of the Co-Curriculum and Assessment Directors, I learned lesson plan formats changed in the fall of 2019, and more explicit directions were given regarding modifications. Through collaboration meetings the previous summer between site directors and the hiring of Co-curriculum and Assessment Directors, the decision was made that modifications should only reflect what was necessary to complete activities successfully. Therefore, all modifications from DESE Form F would be a given; the only modifications listed would be teacher-specific (E. Rackers, personal communication May 4, 2022). Even with these changes, modifications continued to reflect academic needs versus behavioral or regulation needs.

Lesson plan reflections specific to PBL activities beginning with November 2017 and continuing through April 2022 were also reviewed and coded. I conducted the first round of manual coding using deductive codes, resulting in limited modification information. I, therefore, did not do a second round of manual coding. However, I conducted an NVivo automated coding of lesson plan reflections specific to modification to ensure no personal bias was present. Lesson plan reflections relating to modifications during 2020-2022 often reflected on struggles with technology, lack of academic rigor due to remote and virtual instruction, and the need to illuminate pacing guides and use them more as a suggested guide.

Interview questions three and six specifically dealt with modifications teachers perceived necessary for PBL activities specific to students with ACEs. For example, Participant 2 shared how they use a given pacing guide as an "okay yeah, this is what skills are covered and the order I should follow, but other than that, I don't use a pre-printed pacing guide." Moreover, Participant 3 shared the importance of repetition when pacing PBL activities. As only one region participated in the interview process, there was some concern regarding possible bias; however, further exploration of responses highlighted a second theme: combined explicit instruction and using peers as tutors to generate relevant examples. In addition to the interview responses, lesson plan reflections discovered pacing decisions were often made during team collaboration across grade levels. For example, one lesson plan reflection noted team collaboration across regions.

Explicit instruction and directions were mentioned by Participants 3 and 4.   Participants 3 and 4 mentioned a concern about different skill levels and the importance of being transparent when giving instructions. Participant 3 emphasized their point by generating peer groups where peers become tutors for those struggling with academic skills. "Having peer tutors often increases understanding for all students regardless of their skill level, but I have to be clear in what I want the students to do, or projects won't rise to my level of expectation." Participant 4 echoed this sentiment when they shared how they use explicit instruction, specifically through modeling expectations and strategies to ensure all students understand what they are being asked to do.

3. Nontraditional

Residential mental health students, for the most part, have not previously experienced a positive educational experience, so transitioning into a program that values student vision, bases its instruction on authentic experiences, and enables students to demonstrate mastery of content is vital (Haman. 2021; Soures, 2018; Williams, 2018). Additionally, many traditional teaching methods lead to students losing interest in their learning. Through nontraditional learning methods, project-based learning reduces students' passivity, fostering a more enthusiastic attitude toward learning (Olokundun et al., 2018). The use of nontraditional methods highlights the relating portion of the framework as teachers use student interest or current popular trends and create a unit to teach traditional skills. Lesson plan reflections noted thoughts of "areas of interest," "practical way to explore fractions," and "easy to transition to virtual." Perhaps the best articulation of how PBL uses nontraditional methods was from Participant 2. Participant 2 began to laugh during the interview when asked question seven.

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Recommendations for Educational Practices

Although involvement in a project is enjoyable, the academics and mastery standards should not be neglected. Students in a mental health residential school are not exempt from state and district assessment requirements. As a result, teachers should spend significant time planning PBL units to ensure standards are aligned (Hambrick et al., 2018; Hesterman, 2021; The Neurosequential Network, 2020; Olokundun et al., August 2018; RB-Banks & Meyer, 2017). Teachers need to review their grade level and content area scope and sequence to determine skills they believe to be the most relevant and review integrating PBL activities with these skills. Once a teacher has selected these activities, administrators need to provide time for collaboration among grade-level teams or content areas to explore specific PBL activities further to support the underlying skills. In addition to identifying student needs, collaborative times provide an opportunity to implement a suitable instructional method (DeHartchuck, August 2021).

Furthermore, teachers need time to ensure lower skills are mastered so students will succeed. For example, a teacher's desire to focus on skills that require students to think and process logically or use the Neo-cortex, one of the last areas of the brain to develop; however, if lower areas of the brain are not functioning, or if a need is not met in another area, then students will not be able to process, and information will not stick with them (Hambrick et al., 2018; Hesterman, 2021; The Neurosequential Network, 2020; RB-Banks & Meyer, 2017). Additionally, administrators at all levels within a district or residential mental health school need to review professional development to ensure all teachers have the skills necessary to feel they can implement PBL effectively.

Teachers also need time to collaborate with students' management teams, including case managers, to know what triggers a child (Cummings et al., 2017; Soures, 2018). Furthermore, teachers working specifically with students within a residential mental health school who have experienced ACEs need trauma-informed training to ensure the activities selected do not re-traumatize or have the potential to be a trigger for past trauma. Moreover, trauma-informed training can help teachers integrate knowledge about trauma into activities (Haman. 2021; Soures, 2018). Finally, Williams (2018) argued that implementing a specific curriculum in isolation does not offer enough support for students with ACEs. Arguably, the combination of the curriculum, implementation strategies, and teachers having training in trauma-informed practices shows the most significant impact on academics and behavioral change for students with ACEs (Reed, 2019).

4. Relevant and Relatable

Responses relating to perceived modification emphasize the importance of making sure material and units are relevant and relatable to students, emphasizing the importance of relating and reasoning within the conceptual framework, and generating the theme of relevant and relatable. Students have greater engagement over their lessons and projects when the teacher delegates authority to them, allowing them to design projects that demonstrate their learning uniquely and individually (Reed, 2019; Williams, 2018). In addition, 100% of interview participants noted a positive correlation between a perceived modification of relevance and students' willingness to engage in activities and support peers. Social relevance is as important as our students' subject matter, age, and/or intellectual level.

Educators' focus is on bridging gaps and helping our students to progress in their educational journey. By connecting

with other classrooms, pairing content, and inviting virtual speakers, teachers and administrators seek to ensure that the content is relevant to the learners (DeHartchuck et al., 2021; Ferlazzo, 2020). There are no doubts teachers can contextualize the material to make it easier for learners to take in; as noted by Participant 2, "I put a lot of effort into making everything relatable," but providing lessons that can be applied to the "real world," ideally the students' own, but also society as a whole, is fundamental to relevance (Ferlazzo, 2020).

Recommendations for Educational Practices

Teachers need to learn what is currently popular within the culture and then return to their curriculum map to identify ways to integrate current trends with specific skills necessary for given content areas or grade levels. A growing number of educators in the twenty-first century understand that their ability to educate students is directly related to how ready a student is to learn (Bergdahl & Bond, 2021). Teachers then need time to collaborate with others within their grade level or content area to ensure activities reflect current trends and areas relevant to academic skills. Teachers then generate activities or lessons incorporating what is currently on-trend for students wrapping content skills throughout the activities. By incorporating popular culture and generating relatable experiences, students understand the material and engage appropriately within collaborative groups (Jazulie et al., 2020; Viljoen et al., 2018).

In addition to teachers needing time to collaborate on relevant and current trends, students also need the opportunity to collaborate. For example, students from around the district and across the globe can collaborate on projects using technology (DeHartchuck et al., 2021; Ferlazzo, 2020). This type of collaboration would have to be closely monitored within the residential classroom to ensure productivity, appropriate communications, and staying on topic. Teachers can easily include this collaboration through structured chats, paired reading, and virtual guest speakers.

5. Recommendations for Future Research

Combining the findings of this study with those of previous studies indicates additional research studies need to be conducted across three main areas. First, the research could focus on the impact of new methodologies, such as trauma-informed education practices or growth mindsets that overlap and/or intertwine PBL strategies. For example, Ijodi-Maghsoodi et al. (2017) highlighted the impact curriculum centered around understanding trauma has on students.

Secondly, additional studies could be conducted to discover how PBL units are selected and how formalized training specific to PBL, and trauma-informed care impacts teachers' confidence regarding implementation, selection, and engagement of PBL for students with ACEs. Participants in this study indicated they had limited formal training in PBL. Participant 2 indicated a book was ordered to increase PBL through a professional learning community. While this participant read the book, they do not recall any formalized professional learning community or professional development.

Finally, the research could continue with the population outlined within this study; however, the focus would shift towards specific subject engagement, grade level, gender, and/or ethnicity. Additionally, the framework and research questions from this study could be repeated for other groups of exceptional children, such as gifted, to gain teacher perception of how PBL impacts their behaviors and PBL strategies.

6. Conclusions

Traditional learning environments that offer little movement and high amounts of academic stress do not work well for students who have encountered ACEs, as evidenced by an apparent link to separation anxiety, oppositional defiant disorder, impulse control, attention issues, acts of aggression, as well as difficulty navigating relationships with peers and adults (Ford, 2017; Uzezi & Jonah, 2017; Van der Kolk, 2017). The purpose of this qualitative case study was to explore the perception of teachers' modifications within residential mental health facilities in Mid-Missouri specific to PBL units of study. Enhancing educators' understanding of the perceived modifications when using PBL may help educators counter the negative impact of ACEs on behaviors (Hunt et al., 2017; Lee & Blanchard, 2019; Uzezi & Jonah, 2017).

This study supports using project-based learning activities with students across grade levels from elementary to high school who have encountered adverse childhood experiences. Study findings support the perception of specific modifications used during PBL activities for students with ACEs increases engagement and academic skill. Participants interview responses and archived lesson plan reflections triangulated teachers' positive perception of students engaged in PBL activities. Implications from these findings support that PBL is a nontraditional approach to learning as well as uses relevant trends and topics increases engagements and academic success. Through positive relationships and the use of relevant, nontraditional techniques, teachers appeared to keep students engaged, becoming "the cheese around the skill tricking students into doing more academic work" Participant 2.

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