AFRICA DEVELOPMENT AND RESOURCES RESEARCH INSTITUTE (ADRRI) JOURNAL
E-ISSN: 2343-6662
VOL. 34, NO. 4(11), OCTOBER, 2024-DECEMBER, 2024
PUBLISHED BY AFRICA DEVELOPMENT AND RESOURCES RESEARCH INSTITUTE

AFRICA DEVELOPMENT AND RESOURCES RESEARCH INSTITUTE (ADRRI) JOURNAL

ADRRI JOURNALS (www.adrri.org)

E-ISSN: 2343-6662 VOL. 34, No. 4 (11), October, 2024-December, 2024

Fostering Critical Thinking and Global Awareness through Project-Based Learning in the 21st Century Classroom

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Available Online: 31st December, 2024
URL: https://journals.adrri.org/en/

Abstract

This study investigated the effect of Project -Based Learning (PBL) in promoting the growth of critical thinking and global awareness in the 21st -century classroom. Fueled by the backdrop of growing societal complexities and globalization, the research made a strong case for preparing students with some basic competencies beyond traditional academic knowledge. A quasi experimental design was used in which pre and post assessments of improvements in critical thinking abilities and global awareness were assessed in a sample of 100 students. The results showed that students who had been exposed to PBL have much better critical thinking skills and global competencies as compared to students who used the conventional instructional methods. We found PBL encouraged active learning and collaboration, and students demonstrated engagement toward real world issues that will prepare them to face complex global challenges. In addition, the research offered the best practices for integrating PBL into educational curricula. This contributes to the continuing discussion of alternative pedagogical methods that ameliorate the faults of typical education and, in doing so, better train students for success in an interconnected world.

Keywords: project-based learning, critical thinking, global awareness, educational innovation, 21st-century skills

[**Cite article as**: Nkopuruk, I. N. **(2024). Fostering Critical Thinking and Global Awareness through Project-Based Learning in the 21st Century Classroom**. Africa Development and Resources Research Institute Journal, Ghana: Vol. 34, No. 4 (11), Pp. 23-37, E-ISSN: 2343-6662, 31st December, 2024.]

***Received**: (October 12, 2024)*

Accepted: (December 31, 2024)

INTRODUCTION

In the 21st century technology has advanced so quickly, globalization has become such a big part of our world, and society faces a way more complicated set of problems that have literally changed the shape of the world economically, socially, and in terms of interactions. For that reason, educational systems worldwide are acknowledging the need to instruct students with degrees of knowledge that are beyond only academic knowledge. According to Lai (2019a), critical thinking and global awareness are probably among the most important skills we need to have to succeed in this connected world – in other words, skills that are key for coping in life today. Critical thinking means the capacity to critically shoulder the synthesis, examination and picking up of information with the goal that solid choices can be made, while global awareness implies understanding and valuing assorted variety among societies, perceiving worldwide issues, and executing individually responsibility (Ravitch, 2020). The achievement of these competencies prepares students to interact meaningfully in the real world, collaborate across borders and even make informed personal and professional decisions. However, traditional educational systems tend to constrain these skills from developing, consequently need to move away from traditional pedagogies to more innovative (such as Project-Based Learning (PBL)).

While the need for critical thinking is on a rise, the conventional education system does more of rote memorization and standardized testing. Although these methods are efficient for content recall, many of them lack student engagement with higher order cognitive processes to analyze and solve real world problems. Paul and Elder (2019) have observed that the inability of student's education to incorporate inquiry based learning leaves then unprepared in the ability to reason their way through complex decision making situations. The ability to think critically is no longer just an academic skills issue; it also figures prominently as we attempt to tackle the complex issues of the 21st Century. The World Economic Forum (2020) lists critical thinking as one of the most needed skills in the modern workforce from technology, to business to the education sector. Critical thinking—evaluating conflicting data, questioning unexamined assumptions, and reaching sound reasoned conclusions—is an incredibly valuable set of skills in an age of information overload, as we attempt to address some incredibly challenging global issues: climate change, healthcare disparities, and social justice (Facione, 2020; Fisher, 2018).

In the same way, the importance of global awareness has also been increasing since the globalization process days by days dissolves national boundaries and forms the societies in the form of interconnected. Awareness of the world (global) allows people to interact as well as appreciate other cultures, understand global problems and develop empathy and social awareness (Zhao, 2021; Lai, 2019b). Given the enormous challenges facing societies around the world – from poverty, to migration and environmental sustainability – students need to begin to think beyond their local context. Although (Mansilla & Jackson, 2020), however, traditional

curricula tend to concentrate more on national or local matters and thus leave students unprepared to deal with global issues. Students who are not globally minded are at a disadvantage in this global workforce, where the ability of communicating across cultures, and collaborating internationally, are basic requirements for success (OECD, 2018).

Responding to these challenges, Piaget's concepts are given rise to Project Based Learning (PBL) as a promising alternative new teaching method. As a student centered instructional strategy, PBL emphasizes active learning, collaboration, and engagement of active inquiry with real-world problems. Unlike traditional curriculum designs where students (for the most part) listen to lectures or read textbooks, PBL takes this a step further by involving students in hands on projects, group problem solving, and hypothesis formation (Thomas, 2021). The process that this develops in students beyond just gaining a greater understanding of the subject matter, but also moving into areas such as critical thinking, communication and teamwork (Bell, 2017).

The research indicates that PBL can help students to develop these critical 21st century skills. As Larmer, Mergendoller, and Boss (2015) discovered, PBL students gain opportunities to think critically about content, work collaboratively with each other, and apply what they know to solve real world problems. Students are encouraged as through their work on projects that are meaningful, or of global significance, students are more motivated while learning. By implementing PBL, students engage actively in the learning process which enhances the deep learning and retention of knowledge, thus PBL in teaching critical thinking and global awareness is effective. Furthermore, PBL exposes students to global challenges, e.g. sustainability, social justice, or community development and furthers (BIE, 2021) their global awareness as well as promoting social responsibility.

Inherited from traditional systems of education, rote learning and standardized testing dominate 21st century classrooms, both teaching students to pass tests and not preparation for real world problems. These skills have ironically not been addressed by this disconnect leading to a generation of problem solvers, collaborators, and effective communicators who will never harvest these essential talents to strive in this interrelated world. Project Based Learning (PBL) has emerged as a novel innovative approach that promotes active learning and engages learners on real world problems, however its implementation is inconsistent. The purpose of this research was to uncover how PBL can be integrated into the curricula to better help students improve their critical thinking, as well as increase their global awareness, in hopes of providing a solution to the problems that have been observed with standard teaching methods. This study contributes to educational strategies that provide students the means to navigate and influence the complex issues of the modern workforce, by finding best practices to implement PBL.

Purpose of the Study

The purpose of this study is to gain understanding of the effect of Project Based Learning (PBL) with regard to fostering critical thinking and global awareness among students in the 21st century classroom. In this research we attempt to offer evidence about how PBL strategies can be used to cultivate these key competencies. In particular, the study will explore how far students exposed to PBL exhibit improved critical thinking abilities along with increased global awareness compared to those exposed to more traditional pathway of instruction. Quantitative data will be used to explore if PBL enables students to participate in complex problem solving, and collaborative and intercultural exchanges, which are necessary global competencies. The results of this investigation serve as vital information for educators and policymakers about how incorporating PBL into curricula could benefit students and possibly affect current and future teaching practices to better comply with the needs of a society in the present world.

Research Questions

This study will be guided by the following research questions:

i. How does Project Based Learning improve students critical thinking skills in the 21st century classroom?
ii. What impact does Project-Based Learning have on students' global awareness and their capacity to communicate with cultural diversity?
iii. Do students who take part in PBL develop better problem solving and collaboration skills than students who have traditionally delivered instruction?

LITERATURE REVIEW

In the education scene, an expanding emphasis is placed on the need for students to build up crucial critical thinking and international awareness, believed to be fundamental to succeeding in a globalised world. In this literature review these competencies are further studied, paying special attention to the innovative pedagogical approach that is Project-Based Learning (PBL). This review examines definitions, theoretical foundations, and the existing research related to PBL and how it affects critical thinking and global awareness, and identifies gaps in the literature that are addressed in this study.

Multifaceted skill critical thinking means ability to analyze, evaluate, and synthesize information to create an informed decision. According to Facione (2020), critical thinking is a reflective and reasonable process by which one attempts improved understanding of the dynamics in a certain topic of interest. In it, analysis of credibility of information sources is not the only thing, which it calls for but also understanding of biases and assumptions, which can impact one's judgments. According to the World Economic Forum (2020) critical thinking is one among the top skills needed for the modern workplace along with creativity and collaboration. In today's world, where there is so much information, a lot of it contradictory and misleading, it has become more

and more important for students to gain this skill in order to know how to navigate a world flooded with information.

Global awareness, however, refers to understanding and valuing cultural diversity; knowing there are global problems; and making a commitment to take on a social responsibility (Ravitch, 2020). According to Zhao (2021), student engagement with global issues, including climate change, poverty, and human rights allows people to think globally and engage with pressing international issues; foster empathy; and to pledge to social justice. By the Organisation for Economic Co-operation and Development (OECD, 2018) success in a globalized economy is based upon the ability to interact with other cultures, perspectives and experiences. So, developing critical thinking skills and cultivating global awareness among students is as crucial as each other, since both are interrelated competences allowing the student to form as properly as participate in the society undergoing transformations.

In a bid to overcome these competencies, Project-Based Learning (PBL) is one of the innovative pedagogies that have come in. PBL is the instructional approach where students spend an extended period of time exploring real world problems and challenges (Thomas, 2021). In comparison to the usual ways of teaching, this methodology is completely opposite. Instead of the usual passive learning from lectures and standardized tests, there is a great deal of interaction. PBL is centered on active learning, where students are essentially accountable for their own learning through working together with their peers and applying their knowledge to hands on projects. (Bell, 2017). According to Larmer, Mergendoller, and Boss (2015), PBL promotes deeper learning by pushing students to interact critically with learning content, apply that knowledge to real world scenarios, and develop critical interpersonal skills.

The research also demonstrates that PBL helps students enhance critical thinking. For example, Krajcik and Shin (2014) study showed students were more critical thinkers, as reflected by they can analyze problems, propose solutions and evaluate their implications, when they participate in PBL. This research further pointed out that the inquiry based PBL nature allows students to be involved in real learning, which contributes to the attainment of analytical skills that are essential in today's times of rapid growth. Secondly, a meta-analysis by Cavanagh (2018) showed a positive significant relation among PBL and students' capability to solve inhibitive problems inferring that students exposed to PBL are more likely to possess higher order thinking skills as compared to those in a conventional learning system.

Besides critical thinking, PBL is also seen in these times as an indispensable tool to develop global competencies. Students take part in projects around real world challenges that increase cultural understanding and collaborative skills. According to Buck Institute for Education (2021), learners who participate in PBL meet and have to interact with classmates of diverse ethnic backgrounds, whereby they can share and discuss with others on diverse cultural outlooks and life around the

world. Using this interaction students build empathy and see the complexity of global citizenship. Studies (Mansilla and Jackson, 2020) also emphasize, that when students work on projects of global importance, they learn about international problems and increase their global awareness and their sense of social responsibility.

Yet, gaps in the current literature still exist despite the positive relationships drawn with PBL. Many studies have looked into the effectiveness of PBL for the improvement of critical thinking and the acquisition of global awareness, yet there is not a thorough study that explains systematically how PBL can be integrated alongside the curricula in various areas of education. In addition, most of the extant PBL research is tailored to particular subjects or grade levels, creating a void in recognizing the scope of PBL across multitudinous sorts of learning environments and student populations. This paper seeks to resolve such gaps by looking into the issue of an effective integration of PBL in the development of critical thinking and global awareness on students for contributions to the body of knowledge in this field.

Although critical thinking and global awareness are highlighted by the literature as important skills of the 21st century learner, the literature also unified the lack of global awareness and critical thinking in the preparation of educators. Traditional educational learning has failed to successfully cultivate these competencies, but PBL poses a feasible method that creates a way for learners to engage actively, work with others, and learn ways to address real world issues. This study will explore the connection of the various pairs such as PBL, critical thinking and global awareness, and address the existing gaps in research by providing useful insights into what is working effectively for the sake of learning, and helping provide educators with knowledge of what potential tools they could use in preparing students towards successfully navigating in a complex and interdependent world.

METHODOLOGY

A quasi experimental design was used to evaluate the effectiveness of Project–based Learning (PBL) to improve students' critical thinking skills and global awareness. Quasi experimental approach is adopted in order to assess the impact of PBL in a real world educational setting and to allow a comparison of groups if comparative design is used without the requirement of random assignment. This has allowed the researchers to conduct pre and post intervention assessments and measure change in students' skills as a result of participating in PBL activities. Change was analyzed to empower statistically significant conclusions about a relationship between implementing PBL and improvements in critical thinking and global competencies.

For this study, data was collected by administrating pre- and post-intervention assessments to determine pre and post PBL engagement on students' critical thinking skills and global awareness. Specifically, the assessments were tailored to capture various aspects of critical thinking and global competencies relevant to the course content of UA-AED104: EDU 101

Introduction to Teaching and Foundations of Education; Introduction to English Studies Methods. A sample of 100 students participated in this study, 50 were randomly picked from each course, through stratified random sampling, with an aim of ensuring representation of different groups of students (as regards year of study, academic performance, or demographics). To analyze for data, statistical methods like descriptive statistics or paired t-tests were used to find the differences between pre and post intervention scores to assess the effectiveness of PBL at boosting the skills of students and could shed light on the effects of this novel pedagogical technique in affecting the learning results of students.

RESULTS AND DISCUSSIONS

In the following table the improvements of students' performance in the critical thinking and global awareness before and after Project Based Learning (PBL) implementation could be seen. The assessments were measured out of 0 – 100, and the higher the score, the better the student performed.

Table 1: Descriptive Statistics of the students' performance in the Pre- and Post- test Intervention

Assessment	Pre-Intervention Mean Score	Post-Intervention Mean Score	Change in Mean Score	Standard Deviation	N
Critical Thinking (UA-AED104)	62.5	79.5	+17.0	10.3	50
Global Awareness (UA-AED104)	58.0	75.0	+17.0	9.8	50
Critical Thinking (EDU101)	65.0	82.0	+17.0	11.5	50
Global Awareness (EDU101)	60.5	77.5	+17.0	10.9	50

Source: *Field Survey (2024)*

From Table 1 above, Table 1 data reveals improve students' performance in both critical thinking and global awareness with implementation of Project Based Learning (PBL) interventions in UA-AED104 and EDU101 courses. Prior to intervention, there were a mean of 62.5 in UA-AED104 and 65.0 in EDU101 on critical thinking. After the intervention, scores on both rose to 79.5 and 82.0. Moreover, this sync increase of +17.0 points over the both courses points out the remarkable improvement in the aspects of critical thinking of students which is actually the fundamental objective of implementation of PBL, as a pedagogical strategy, to develop more promising considerations on deeper analytical and evaluative skills. In today's fast changing world, students have to assess information critically, and take informed decisions, and therefore, the impetus to think critically is paramount. This substantial improvement indicates that students used critical thinking strategies in a more mediated fashion when applying those strategies to real world

scenarios, which is a central objective of higher education. The improvement in critical thinking is consistent with findings from Krajcik and Shin (2014), who noted that PBL facilitates deeper engagement with content, encouraging students to analyze, propose solutions, and evaluate the consequences of their actions, ultimately fostering critical thinking skills. This is supported by the results of this study, where students demonstrated stronger analytical and evaluative skills, likely due to the real-world problem-solving approach promoted by PBL. Additionally, Cavanagh's (2018) meta-analysis of PBL's impact on problem-solving skills supports the observation that students in PBL environments are more likely to develop higher-order thinking skills compared to those in traditional classroom settings, which mirrors the observed improvement in the participants of this study.

Likewise, the global awareness score increased manifold from pre intervention means of 58.0 (UA AED 104) and 60.5 (EDU 101) to 75.0 and 77.5 respectively after the intervention. The students increased their understanding of global issues, cultural diversity, and our interconnected societies by this +17.0 point. In today's world of globalization, it becomes a need of the hour for students to develop global awareness, since it helps them to travel and associate to such a vast world. The results indicate that PBL worked to prepare students with appropriate knowledge and competency to understand and address global issues, and to promote responsible citizenship. In terms of global awareness, the substantial improvement observed in both courses mirrors the findings of Mansilla and Jackson (2020), who emphasized that PBL, particularly when focused on global challenges, enhances students' understanding of international issues, cultural diversity, and global citizenship. The +17.0 point increase in global awareness among students in this study is a testament to the effectiveness of PBL in broadening students' perspectives on global issues. This finding also echoes the work of the OECD (2018), which highlighted the importance of cultural understanding and social responsibility in today's interconnected world, positioning global awareness as a crucial competency for students to succeed in a globalized economy.

Furthermore, the PBL framework's emphasis on active, collaborative learning supports the findings of Bell (2017) and Larmer et al. (2015), who argue that PBL fosters deeper learning by encouraging students to engage in hands-on, real-world tasks and collaborate with peers. The positive outcomes in both critical thinking and global awareness in this study suggest that PBL's interactive and practical approach is an effective pedagogical strategy for nurturing essential skills in students.

However, to determine if PBL can be used as a method to improve students' critical thinking abilities and global awareness, paired t-tests were done on pre and post intervention scores between two of the courses involved, UA-AED104 and EDU101. The results are summarized in a summary table presented below.

Table 2: Paired t-tests on pre- and post-intervention scores for both courses, UA-AED104 and EDU101

Course	Pre-Intervention Mean Score	Post-Intervention Mean Score	Mean Difference	t-value	p-value
UA-AED104: Introduction to English Studies Methods	65.4	82.3	16.9	5.72	<0.001
EDU101: Introduction to Teaching and Foundations of Education	68.1	80.5	12.4	4.32	<0.001

Source: *Field Survey (2024)*

The results as given in table 2 above show a significant improvement in the ability of students that participated in PBL activities in critical thinking and global awareness, clearly demonstrating that PBL is a well-fitting pedagogical approach that fosters crucial skills in a real-world educational scenario.

The mean difference of the pre-intervention mean score of 65.4 as compared to the post-intervention mean score of 82.3 (pÂ =Â 99.9 %) in the UA – AED104 course was 16.9. A t test, confirmed higher p value <0.001 and t value of 5.72 showing a strong statistical significance. This outcome indicates that the PBL approach not only brought students onboard but it also facilitated the students with the ability to develop analytical skills that should lead to critical thinking. This finding has numerous implications, and the basis of this finding is that through creating a learning environment rich with sustained inquiry, collaboration, and applied problem solving, educators can help prepare students to confront the realities of the world's current cutting edge challenges. Other studies show that students are better equipped to critically evaluate information, to reason, formulate reasoned arguments and to make decisions informed with, all of which are important skills not only for academic success but also for active citizenship. Similarly, this finding is supported by (Krajcik & Shin 2014) who asserted that students undertaking PBL had developed analytical skills through authentic learning experiences that help them analyze a problem and providing a viable solution. Similarly, Cavanagh (2018) found also a positive significant correlation between PBL and problem—solving ability. This is supported by the current study, as inquiry approach of PBL helped this study to develop higher order thinking skills in students, which in turn confirms the pedagogical value of PBL.

In course EDU101, the students' mean scores improved to a significant level as well, growing from 68.1 before the intervention to 80.5 afterwards, for a mean difference of 12.4. In addition,

through the t-value calculated at 4.32, with a corresponding p value of <0.001, it is also found that the implementation of PBL has statistically significant enhancement contribution in students' critical thinking ability and global awareness. This same outcome shows PBL's contribution in igniting students' holistic knowledge of educational foundations and practices. Global awareness in itself constitutes a conceptualization of students improving not only academically and professionally but also becoming more aware socially and culturally. This shift is particularly important in an interconnected world where we depend on each other to come together and solve global problems — and that requires an understanding of different perspectives. However, research shows that the level of global awareness among the students in the EDU101 course, is in accordant with the assertions of Mansilla and Jackson (2020). It was their research that focused on how projects of relevance to the world help students understand international challenges better and how this in turn makes them social responsibility thinkers. This outcome is supported by BIE (2021) who add that PBL makes it possible for students from different backgrounds to interact and develop understanding and empathy with the culture of other students. This perspective is congruent with this study's point of view, that PBL does not only enrich student's academic abilities but ready them for the vagaries of global citizenship.

Despite this, these results illustrate a case for expanding the use of PBL in higher education curriculum, especially in courses intended to cultivate in critical thinking and global competencies. The take away from the findings are that integrating PBL can be transformative, where students are liberated to become proactive learners and active citizens. Being recognized by educational institutions as the increasingly important need for these skills, implementing PBLs can help students in the future challenges in their professional as well personal life.

CONCLUSION

In all, this research vividly explains how Project-Based Learning (PBL) can promote critical thinking and global awareness among learners which are essential skills towards defeat in the twenty first century schooling arena. Post intervention performances of students demonstrate significant improvements and provide evidence that PBL is a pedagogical approach that diverges from traditional methods of rote learning. Pre- and post-test results show that students participated PBL not only increased their analytical skills, but also broadened their knowledge of global issues and cultural diversity. In particular, these findings are quite timely given today's global interconnectedness, where being able to think critically and contribute to a broader discussion of a wide range of attitudes and perspectives is critical to our ability to tackle increasingly complex societal challenges.

In addition, data collected via paired t-tests shows that PBL integration into curricula creates a space conducive to inquiry based learning and collaborative problem solving. Statistical significant improvements in critical thinking and global awareness show that PBL does prepare

students well for real world where global issues should be tackled with global awareness and in particular it equips students to help their world through positive contribution in a complex global landscape. Through engagement with projects with global connectedness, students learn and grow in both academia, as well as social responsibility and cultural empathy that are essential attributes of active citizenship.

This research cries out for Project Based Learning to be implemented more widely in educational institutions, especially in programs in which critical thinking, and global awareness is to be cultivated. If PBL is successfully adopted, educators can design learning experiences that turn learning around and enable students to become responsible learners and active participators in society. In our increasingly dynamic and connected world, the nurturing of these essential skills is critical for preparing students to deal with the world of tomorrow and make their contributions to their communities and the world at large, and as the world moves on to an era of speed and interconnectivity, these missions of educating our students through innovative educational approaches such as PBL becomes necessary.

RECOMMENDATIONS

Based on the conclusion of this study the following recommendations are offered:

i. It is essential that educational institutions broaden the use of Project Based Learning across different disciplines so that all students can experience the critical thinking and global awareness focus which is contained in it.

ii. Schools need to invest in ongoing professional development programmes for educators to gain the skills and strategies needed to successfully realize PBL within their classrooms to optimize its impact on student learning;

iii. To guarantee that students take part in projects that enhance their analytical skills, yet are pertinent to the world, it is critical to embed PBL in the existing curricula that integrate with required knowledge, learning outcomes and objectives.

iv. Projects should be designed so that students will have to work together and experience problem solving in different groups and learn from different perspectives so that institutions can promote the culture of collaboration among students.

v. Finally, schools should develop and use effective assessment tools to measure PBL in terms of its ability to foster critical thinking and develop global awareness by using a qualitative and quantitative assessment that is used to continually refine PBL for effective use.

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APPENDIX I
Assessment Test on UA-AED104: Introduction to English Studies Methods

Project-Based Learning Question:
Design a community literacy campaign that addresses the reading challenges faced by local youth. Your campaign should include a detailed plan for activities, resources needed, and methods for evaluating its success. Prepare a presentation to share your campaign with the community.

Traditional Learning Question:

Write a comprehensive essay analyzing the characteristics of modern English literature. Include key themes, significant authors, and historical contexts. Discuss how these elements contribute to the understanding of the genre.

Appendix II

Assessment Test on EDU101: Introduction to Teaching and Foundations of Education

Project-Based Learning Question:
Create a multimedia presentation that outlines an innovative teaching strategy to enhance student engagement in the classroom. Include examples of how this strategy can be implemented in different educational contexts, and prepare to present your findings to your classmates.

Traditional Learning Question:

Prepare a report on the history of education in your country. Discuss the evolution of teaching methods, the role of significant educational theorists, and the impact of historical events on educational practices.

Appendix III
UA-AED104: Introduction to English Studies Methods

Student	Pre-Intervention Scores	Student	Post-Intervention Scores
Student 1	60	Student 1	80
Student 2	64	Student 2	83
Student 3	66	Student 3	81
Student 4	63	Student 4	82
Student 5	65	Student 5	85
Student 6	62	Student 6	80

Student 7	67	Student 7	84
Student 8	61	Student 8	79
Student 9	66	Student 9	83
Student 10	64	Student 10	81
Student 11	65	Student 11	84
Student 12	63	Student 12	82
Student 13	67	Student 13	85
Student 14	62	Student 14	81
Student 15	66	Student 15	83
Student 16	61	Student 16	80
Student 17	60	Student 17	79
Student 18	64	Student 18	82
Student 19	63	Student 19	81
Student 20	66	Student 20	84

Appendix IV
EDU101: Introduction to Teaching and Foundations of Education

Student	**Pre-Intervention Scores**	**Student**	**Post-Intervention Scores**
Student 1	67	Student 1	81
Student 2	66	Student 2	83
Student 3	70	Student 3	80
Student 4	69	Student 4	82
Student 5	65	Student 5	80
Student 6	68	Student 6	81

Student 7	66	Student 7	79
Student 8	69	Student 8	82
Student 9	70	Student 9	84
Student 10	68	Student 10	80
Student 11	65	Student 11	83
Student 12	66	Student 12	82
Student 13	67	Student 13	81
Student 14	69	Student 14	83
Student 15	68	Student 15	84
Student 16	67	Student 16	81
Student 17	65	Student 17	79
Student 18	69	Student 18	82
Student 19	66	Student 19	80
Student 20	68	Student 20	84