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Enhancing graduate employability skills and self-reliance through problem-solving and creative thinking among undergraduate students of public universities in North-Central Nigeria

GIDADO, Bello Kumo¹ & DIFFANG, Abel Dayo²^{1&2}Department of Educational Foundations,
University of Abuja, Abuja, Nigeria

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Corresponding Author: GIDADO, Bello Kumo

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Abstract

As Nigeria increasingly seeks to achieve sustainable development which is key in 21st century, there is now a pressing re-thinking of how its educational systems can better prepare graduates who are well-equipped to contribute meaningfully to national development and become employable, employers of labour and self-reliant. Hence, this study investigated and explored how problem-solving methodology affects creative thinking skills for employability and self-reliance among undergraduate students in public universities in North-central Nigeria. Three objectives and three null hypotheses guided the study. A descriptive survey and correlational research designs were employed for the study. The population of the study consisted of all (229, 365) undergraduate students in public universities in North-central Nigeria, while the sample size was made up of 364 respondents from the population of the study. A researcher structured questionnaire validated by experts in the university of Abuja was the main instrument employed for data collection. Pearson correlation and simple linear regression analysis were the inferential statistics employed for the hypotheses. The findings revealed a statistically significant positive correlation between problem-solving method and creative thinking skills ($r = 0.280$, $p < .001$), while other results further indicated positive significant effect of problem-solving method on employability among students with unstandardized coefficient ($B = 0.214$, $p < .001$), and positive significant effect of problem-solving method on self-reliance among undergraduate students in public universities in North-Central Nigeria with unstandardized coefficient ($B = 0.285$, $p < .001$). Although the modest R^2 values suggest that other additional factors could influence these outcomes. The study recommended amongst others, the need to incorporate problem-solving and creative programmes in the context of students' learning to enhance their readiness to manage challenges in the existing and future labour market. Rethinking education to emphasize problem-solving and creative thinking skills and ability is essential for preparing students for the complexities of the rapidly changing world where

adaptability, innovation, and independence are key.

Keywords: Rethinking Education, Problem Solving, Creative Thinking, Employability, Self-Reliance.

INTRODUCTION

Education is the life-wire and bedrock of any society irrespective of the societal ethos. Education is also widely considered to be the fountain, underpinning basis and foundational source of any country's developmental stride which could include the ability to develop human and capital resources that could propel and stimulate socio-economic growth and development particularly with a structured educational system that is pragmatic in nature or receptive to technological innovation of 21st century. It is common knowledge that many nations around the globe who are open and accommodating to innovational changes in their educational setting have experienced and continue to experience giant strides in technological advancement, socio-economic growth and development due to the pragmatic and functional nature of their educational system especially, the instructional methodologies employed in their various classrooms which encourages critical thinking skills and problem-solving ability which are fundamental in 21st century educational environment and has succeeded in creating individuals who are adequately employable, employers of labour and self-reliant in their various endeavors.

Therefore, critical thinking skills are indispensable criterion in reducing unemployment rate particularly in a country like Nigeria where the unemployment rate is so alarming. Taiwan, Japan, China, UK, Qatar, Singapore, USA among other industrialised and technological advanced nations of the world are good examples of countries with massive creative individuals who are self-reliant and employers of labour due to the structural architecture of their educational system. Although no country in the world is self-sufficient in terms of human and capital resources. Most of these countries have succeeded in structuring their educational system through appropriate problem-solving methodology which enhances creative thinking skills which could be a recipe for employability and self-reliance. The 21st century, with its rapid technological changes, globalisation and information technological age is transforming what it means to be skilled and creative in a thinking new world order since we live in a world that is flexible, complicated and driven by creative thinking skills, problem solving ability and innovation, not where mundane methodology in form of transmission driven method like rote learning, lecturing method and memorization which are not adequate enough to be able to navigate through the complex educational landscape of the 21st century. While this has served as a go-to for producing graduates that are not adequately equipped with the skills required for the 21st-century workplace as employers tend to place more premium on critical thinking, innovation, and adaptability (Adeyanju, 2021).

Some teachers particularly in higher institutions of learning like universities in Nigeria are yet to embrace the innovative trend of 21st century by utilising a more effective and sophisticated 21st century teaching methodology such as problem-solving, instead, lecturing method which is teacher centred and not susceptible to creative thinking skills, problem solving ability and innovation seems to be synonymous with most of our public institutions of learning. Education in many Nigerian universities still centers on rote learning and theoretical knowledge and exam-based assessment thus neglecting to cultivate creative and analytical abilities which is essential to solving problems (Ogunleye, 2019). Problem-solving ability does not only improve the creative thinking skills of students but could go a long way in influencing and determining their

world of works and self-reliance even after graduating from school. In the constantly changing and global environment, creativity has come to the forefront as a key skill alongside problem solving, for individuals to thrive as well as for society at large (OECD, 2018).

Problem-solving which is a cognitive driven pedagogical educational method allow students to identify a pertinent complex educational related problem within the scope of their environment while understanding the nature of the problem, evaluate diverse strategies using their cognitive ability in deducing or proffering appropriate solution to the said problem. Problem-solving is the cognitive process of finding a means to achieve goals (Mefoh et al., 2017). Problem solving method involved high level of cognitive skills in critical thinking to address any identified educational related problem. Problem-solving is a high-level thinking skill that requires the ability to identify the nature of a problem, deconstruct it, and develop an effective set of actions to address the challenges related to it (Oliveri et al., 2017). Problem-solving method could invariably be expediently fundamental and essential in helping students with the necessary critical thinking skills and problem-solving abilities to meet up with the demands of 21st-century innovative and competitive society especially after leaving school. Problem-solving helps students develop skills to solve problems in the real world (Sukariasih et al., 2020), and it influences how they construct their thoughts and knowledge (Fitriani et al., 2020). Like other universities around the globe, those in North-Central Nigeria are tasked with producing thinkers and innovative leaders; it demands excellence for students to be equipped towards discharging competencies that could provide solutions to difficult problems (Adewumi, et al., 2021). Moreover, most employers of labour in the world of works would prefer individuals with critical thinking skills and problem-solving abilities. Graduates that can solve problems collaboratively and effectively are sought after by employer (Bhatti et al., 2022).

Evidence has shown that 80% of graduates in most Nigerian tertiary institutions find it hard to get employment every year (Undiyaundeye & Otu, 2015). The researchers continued that sixty-four (64) million of the Nigeria graduates are unemployed while one million six hundred thousand (1.6million) are underemployed bringing the total of graduates' population to eighty (80) million. Reasons for this may be due to, old ways of learning outdated teaching methods, missing the practical side of knowledge application (practice), not having digital way out in some cases, and low or no accentuation on collaborative approach Olorunfemi & Olufemi, 2018. The aforementioned figure might have drastically increase presently considering the ineptitude of government towards education in Nigeria and the economic upheaval that is ravaging the country at present which is affecting almost every aspect of our daily lives. If the above percentage is subtracted from the over 200 million Nigerian population, it will be agreed upon that a problem-solving method for undergraduates' students in our public universities after leaving school which could enhanced creative thinking skills and problem-solving ability for futuristic purposes which could boost employability and self-reliance among students after leaving school which will be a no brainer. Many literatures have signposted how critical and crucial problem-solving methodology could be in enhancing creative thinking skills which could aid employability. For instance, Purwati and Alberida (2022) upheld that improving creative thinking skills can be done through the learning process in the classroom by applying learning models that can train creative thinking skills. Also, Artess et al. (2017) posits that if students have been grounded and acquire an in-depth knowledge of employability skills, it will give the

individual student the opportunity to be conscious of their would-be skills, attitudes, and ability to turn into active citizens in the workforce. Lassig (2020) also corroborated that if schools understand the different purpose and ways in which students approach creativity, they might more effectively provide tailored support for creative development and achievement.

Consequently, problem solving methodology could equally enhance creative thinking skills which could enable and encourage self-reliance among undergraduate students after graduating from the university. While it is true that universities play a crucial role in economic growth and development, it is equally important to consider social imperatives rooted in education for self-reliance within these institutions (Okanda, 2024). Irrespective of the imperative of adequate methodology to enhance entrepreneurial skills and self-reliance, Nwosu and John (2018) revealed that teaching methodology adopted during entrepreneurship education and absence of research support and linkages were among challenges impeding the success of entrepreneurship education in Nigeria, which might be affecting the production of employable graduates in our universities. Since most of our public universities employ pedagogical methodologies that do not encourage creative thinking skills for self-reliance and entrepreneurship, Eleonora et al. (2014) maintained that we need to establish an appropriate learning environment and adopt those teaching methodologies that will encourage our students to develop their creativity and take advantage of opportunities in the real world. Hence, a pragmatic methodology such as problem-solving could be a signpost for entrepreneurial spirit and self-reliance. Sanga (2016) emphasizes that education for self-reliance (ESR) entails that learners in educational institutions acquire confidence, responsibility, autonomy, and actively engage in democratic processes. A problem-solving methodology could go a long way in instilling self-confidence, responsiveness, critical thinking and innovative ideas which could spur our teeming youths for self-reliance and for them to become employers of labour in 21st century after leaving school. Therefore, Nyerere cited in Sanga (2016) concluded that, educating students for self-reliance entails equipping them to become proactive contributors to society as self-sufficient individuals, thus promoting a transition from socio-economic dependency to an independent mindset.

The widening gap between education and the real-world needs is a herculean task in Nigeria considering the overreliance of certificate education instead of the know how or educational practicability which is the basis of 21st century world of works. Although Many public universities in Nigerian especially the North-Central also face issues of infrastructure deficiency, archaic curriculum structure, crowded lecture halls and inadequate digital resources. It fosters some challenges and shacks creativity, critical thinking and problem-solving abilities amongst students (Abdulkareem & Fasasi, 2020). As Nigeria increasingly seeks to achieve sustainable development which is key in 21st century, there is now a pressing re-thinking of how its educational systems can better prepare graduates who are well-equipped to contribute meaningfully to national development and become employable, employers of labour and self-reliant. Hence, this study will investigate how problem-solving methodology affects creative thinking skills for employability and self-reliance among undergraduate students in public universities in North-central Nigeria. The study will analyse the current state of education in these universities and assess how well current pedagogies implicitly affect the development of these essential skills.

Statement of the Problem

While education is the life-wire and arbiter of societal growth and development particularly a functional and pragmatic education which should be the basis of 21st century technologically advanced driven society. The classroom chiefly with adequate problem-solving methodology is the builder and moulder of developmental characteristics which could enhance all round development of students most especially in inculcating creative thinking skills and problem-solving ability which could all propel students for employability and self-reliance after leaving school. Hence, effective and problem-solving 21st century teaching methodology becomes paramount and fundamental. The advancement in technology has brought diverse 21st century advanced teaching mediums and methodologies such as virtual reality classes, blended learning, flipped classroom, inquiring based learning, gamification, collaborative teaching method which are mostly problem solving based and are majorly student or learner centred and ought to be the centrepiece of modern teaching and learning process where teachers and students can utilised some of these methodologies to enhance and augment the teaching and learning process which could ardently improve critical thinking skills and problem solving ability of students and aid prepare them for the world of works, make them employable, employers of labour and self-reliant after leaving school.

Notwithstanding the prospect of problem-solving teaching methodology and the prospective imperativeness in augment the teaching and learning process, common observation indicates that undergraduate students in public universities in North-Central Nigeria are still taught majorly with the traditional transmission content-driven educational method, students are taught what to think, rather than how to think creatively and solve problems. Several public universities in North-central Nigeria still operate using these mundane and outdated methodologies which has made students helpless and incapable of solving real life challenges after leaving school. It has also deterred students from being employers of labour, employable and self-reliant despite the importance of problem-solving method which could improve creative thinking skills meant for 21st century technological driven economy. Evidence has equally shown that many students in these public universities are poor at creative thinking skills and fail as problem solvers. This highlights how graduates are unlikely to be able to compete in the world labour market, which could also worsen the existing and prevailing unemployment and underemployment rate which already seems to be a nightmare in Nigeria at present.

Informed by this gap, the present study therefore examines problem solving methodology on creative thinking skills for employability and self-reliance among undergraduate students in public universities in North-central Nigeria.

Purpose of the Study

The overall purpose of this study is to investigate problem-solving methodology on creative thinking skills for employability and self-reliance among undergraduate students in public universities in North-central Nigeria. Specifically, this study anticipates to:

- (i) find out if there is any relationship between problem-solving methods and creative thinking skills among undergraduate students in public universities in North-Central Nigeria.

- (ii) examine if there is any effect of problem-solving method on prospective employability among undergraduate students in public universities in North-Central Nigeria.
- (iii) examine if there is any effect of problem-solving method on self-reliance among undergraduate students in public universities in North-Central Nigeria.

Hypotheses

The following null hypotheses emanating from the above research objectives were raised at alpha 0.05 level of significance to guide the study.

H01: There is no statistically significant relationship between problem-solving method and creative thinking skills among undergraduate students in public universities in North-Central Nigeria.

H02: There is no statistically significant difference in the effect of problem-solving method on prospective employability among undergraduate students in public universities in North-Central Nigeria.

H03: There is no statistically significant difference in the effect of problem-solving method on self-reliance among undergraduate students in public universities in North-Central Nigeria.

MATERIALS AND METHODS

Study Design

A descriptive survey and correlational research designs were adopted for the study. A descriptive survey research design was used to enable the collection of data from a large sample of respondents without the manipulation of any variable which gave the researchers the opportunity to obtain the opinions of respondents without any sort of bias or prejudice. While correlational research design allowed the researchers to ascertain the relationships between problem solving teaching method and creative thinking skills among undergraduate students which were all investigated.

Population of the Study The population for this study involved all undergraduate students in public universities in North-Central Nigeria. Universities in this geopolitical zone are those in the states of Benue, Kogi, Kwara, Nasarawa, Niger, Plateau and the Federal Capital Territory, Abuja. As estimated in the National Universities Commission (NUC) database, the total student enrolment in these universities is about two hundred and twenty-nine thousand three and sixty-five (229, 365) (NUC, 2019).

Sample Size and Sampling Procedure

The sample size for this study was arrived at through the Krejcie and Morgan (1970) formula to ensure that the study would be statistically valid. After estimating the population to be at two hundred and twenty-nine thousand three hundred and sixty-five students (229, 365), it was deemed that a sample of 384 students was large enough for the study. To account for non-response, a total of 400 respondents were targeted. From the 400 questionnaires given out 364 questionnaires were returned for analysis.

A multistage sampling technique was employed. In the first stage, stratified random sampling was used to select three states from North-Central Nigeria: Kwara, Benue, and the Federal Capital Territory (FCT), Abuja. In the second stage, two public universities were selected from each of the three states, resulting in a total of six universities. Finally, simple random sampling

was used to select undergraduate students from various faculties within each university. This ensured the inclusion of students from different academic disciplines and levels of study.

Instrumentation

The instrument for data collection was a researcher structured questionnaire titled: problem solving methodology on creative thinking skills for employability and self-reliance questionnaire (PSMCTSESRQ) which was designed specifically for this study. The questionnaire was divided into four sections: section (A) was meant for demographic data, (B) for statements related to problem solving method on creative thinking skills, (C) for statements related to problem solving method on creative thinking skills for employability, while section (D) was for statements related to problem solving method on creative thinking skills for self-reliance. The structured questionnaire was designed along the four-point Likert scale of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD). The instrument was validated by measurement and evaluation experts in the Department of Educational Foundations, University of Abuja for content and construct validity. To ascertain the reliability of the instrument, a pilot test was conducted using 20 undergraduate students from University of Abuja who were not part of the main study while Cronbach Alpha was employed to establish the internal consistency of the items in the instrument which yielded a reliability index of 0.74.

Method of Data Analysis

The data collected via the structured questionnaire were analyzed using both descriptive and inferential statistics. Descriptive statistics, such as frequency counts and percentages, were used to summarize the demographic characteristics of the respondents and their responses to the research questions. While inferential statistics such as Pearson product moment correlation (PPMC) and regression analysis were used to test the three hypotheses. While PPMC was used to test Hypothesis one, simple linear regression was employed to test hypotheses two and three.

RESULTS

H01: There is no statistically significant relationship between problem-solving method and creative thinking skills among undergraduate students in public universities in North-Central Nigeria.

Table 1

Pearson Product Moment Correlation between problem-solving method and creative thinking skills among undergraduate students in public universities in North-Central Nigeria.

Variables	N	r-cal	P-value	Decision
problem-solving method	364	.280**	<.001	Rejected
creative thinking skills				

** . Correlation is significant at the 0.05 level (2-tailed)

As shown in table 1, the result of Pearson product moment correlation testing the relationship between problem-solving method and creative thinking skills among undergraduate students in public universities in North-Central Nigeria. The coefficient of $r = 0.280$ indicates that the use of problem-solving method is associated with enhanced creative thinking skills among undergraduate students in public universities in North-Central Nigeria, while the $p\text{-value} < .001$. Since the $p\text{-value} < .001$ which is less than the $r\text{-value}$ that signifies a positive linear relationship between the variables. This signpost that the postulated null hypothesis is therefore rejected for the alternative hypothesis. Hence, it is inferred that high level of problem-solving method is

related to high level of creative thinking skills. It is on this note that it was concluded that, there is statistically significant relationship between problem-solving method and creative thinking skills among undergraduate students in public universities in North-Central Nigeria.

H02: There is no statistically significant difference in the effect of problem-solving method on prospective employability among undergraduate students in public universities in North-Central Nigeria.

Table 2

Simple Linear Regression Analysis on the effect of Problem-Solving Method on Employability among undergraduate students in public universities in North-Central Nigeria

B	Std. Error	Beta	T	Sig.
(Constant)	4.369	0.451		<.001
Problem-Solving Method	0.214	0.043	0.252	<.001

$R^2 = 0.064$, $F(1, 362) = 24.57$, $p < .001$

Dependent Variable: Employability

As shown in table 2, the result of simple linear regression analysis to indicate the effect of problem-solving method on prospective employability among undergraduate students in public universities in North-Central Nigeria. The simple linear regression analysis indicates that problem-solving method have a significant positive effect on employability skills among students. The unstandardized coefficient ($B = 0.214$, $p < .001$) shows that for every one-unit increase in the application of problem-solving method, employability skills increase by 0.214 units. Although the model accounts for only 6.4% of the variance in employability skills ($R^2 = 0.064$), the significant F-statistic ($F(1, 362) = 24.57$, $p < .001$) confirms that problem-solving methods are important predictor of employability skills, underscoring their value in enhancing students' readiness for the job market. This implies that, there is statistically significant difference in the effect of problem-solving method on prospective employability among undergraduate students in public universities in North-Central Nigeria.

H03: There is no statistically significant difference in the effect of problem-solving method on self-reliance among undergraduate students in public universities in North-Central Nigeria.

Table 3

Simple Linear Regression Analysis on the effect of Problem-Solving Method on Self-Reliance among undergraduate students in public universities in North-Central Nigeria.

B	Std. Error	Beta	T	Sig.
(Constant)	3.447	0.456		<.001
Problem-Solving Method	0.285	0.044	0.324	<.001

$R^2 = 0.105$, $F(1, 362) = 42.57$, $p < .001$

Dependent Variable: Self-Reliance

As shown in table 3, the result of simple linear regression analysis to indicate the effect of problem-solving method on self-reliance among undergraduate students in public universities in North-Central Nigeria which was carried out. The simple linear regression analysis reveals that problem-solving method have a significant effect on self-reliance among undergraduate students in public universities in North-Central Nigeria. The unstandardized coefficient ($B = 0.285$, $p < .001$) indicates that for each one-unit increase in the application of problem-solving method, there is an increase of 0.285 units in self-reliance. the model explains 10.5% of the variance in self-reliance ($R^2 = 0.105$), which is a meaningful proportion. The significant F-statistic ($F(1,$

362) = 42.57, $p < .001$) further confirms that problem-solving method is a crucial predictor for self-reliance, highlighting the importance of problem-solving method in fostering independence and self-sufficiency among students. This implies that, there is statistically significant difference in the effect of problem-solving method on self-reliance among undergraduate students in public universities in North-Central Nigeria.

DISCUSSION

The result of this study found that there was positive statistically significant correlation between problem-solving method and creative thinking skills ($r = .280$, $p < .001$) among undergraduate students in public universities in North-Central Nigeria. Reinforcing the idea that structured problem-solving methodology could foster creative thinking skills among undergraduate students which is in line with Sukariasih et al. (2020) who had highlighted that, Problem-solving helps students develop skills to solve problems in the real world and it influences how they construct their thoughts and knowledge (Fitriani et al., 2020). Oliveri et al. (2017) Equally reiterating that, problem-solving is a high-level thinking skill that requires the ability to identify the nature of a problem, deconstruct it, and develop an effective set of actions to address the challenges related to it.

The result equally showed that there is significant positive effect of the problem-solving method on the employability of undergraduate students in public universities in North-Central Nigeria. The unstandardized coefficient ($B = 0.214$, $p < .001$) indicates that students' employability skills increase as they apply method of problem-solving. This result is consistent with Artess et al. (2017) who posits that if students have been grounded and acquire an in-depth knowledge of employability skills, it will give the individual student the opportunity to be conscious of their would-be skills, attitudes, and ability to turn into active citizens in the workforce. Bhatti et al. (2022) also emphasized that, graduates that can solve problems collaboratively and effectively are sought after by employer. Other experiences such as internships and work placements are also equally important to building employability (Jackson, 2016; Tomlinson 2019). The model, however, accounts for only 6.4% of the variation in employability ($R^2 = 0.064$), which suggests that problem-solving is just one of many factors involved in employability outcomes.

Finally, the result of the study also demonstrates a positive, significant effect of problem-solving method on self-reliance among undergraduate students in public universities in North-Central Nigeria. The unstandardized coefficient ($B = .285$ $p < .001$) shows that an increase of one unit of problem-solving applications leads to an increase in self-reliance by 0.285 units. In other words, engaging in structured problem-solving method more often favours the development of traits of self-sufficiency and independence in students. The significant F-statistic ($F(1, 362) = 42.57$, $p < .001$) suggests that problem-solving method is an important predictor of self-reliance. This finding aligns with Nwosu and John (2018) who revealed that teaching methodology adopted during entrepreneurship education and absence of research support and linkages were among challenges impeding the success of entrepreneurship education in Nigeria, which might be affecting the production of employable graduates in our universities. Also, Okanda (2024) asserted that, it is equally important to consider social imperatives rooted in education for self-reliance within these institutions.

CONCLUSION

This study has demonstrated the positive relationship between problem-solving method and the development of critical thinking skills for employability, and self-reliance among undergraduate students in public universities in North-Central Nigeria. Problem-solving method were found to significantly enhanced students' creative thinking abilities which positively contribute to their employability skills and foster greater self-reliance. However, the study also revealed that problem-solving method alone do not account for a large proportion of the variance in these skills, suggesting the need for a broader educational approach that integrates more diverse pedagogical 21st century strategies. In conclusion, rethinking education to emphasize problem-solving and creative thinking skills and ability is essential for preparing students for the complexities of the rapidly changing world where adaptability, innovation, and independence are key. Integrating problem-solving strategy into the educational framework can help produce graduates who are better equipped to face real-world challenges. However, the relatively modest R² values suggest that more comprehensive educational reforms may be needed to fully nurture these skills in students. It is high time for institutions of learning in Nigeria to rethink and relook at their teaching methodologies which should resonate with 21st century standards and best practices.

Recommendations

Based on the findings of this study, the following which is in line with the purpose and objectives of the study are recommended

- i. Universities should consider embedding problem-solving educational activities into the core curriculum across all disciplines. This could include attending workshops, symposiums, involve students in case studies, project-based learning, real-world simulations, mentorship programmes assignments that require innovative solutions, presentations, and reflective essays that all supports students' independent learning which will definitely encourage students to apply problem-solving methods in various contexts which could boost their creative thinking skills and abilities.
- ii. Universities should equally partner with different industrial companies and other creative industries to expose students to real-world challenges, experience, internships, co-op programs, and collaborative projects that can provide students with practical experiences which could further enhance their employability skills and problem-solving capacity.
- iii. Universities should promote extracurricular programs such as hackathons, debate clubs, and entrepreneurship challenges that encourage students to solve problems creatively and work collaboratively, thereby enhancing self-reliance.

Suggestion for Further Studies

The researchers suggest that further research studies could be fundamental and imperative in other geopolitical zones of Nigeria particularly north-west and north-east Nigeria. Furthermore, other factors that could contribute to the development of 21st-century skills for employability and self-reliance, which may include emotional intelligence, digital literacy and communication skills should equally be explored. This will provide a more holistic understanding of how to prepare students for the demands of the modern workforce.

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