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ASSESSMENT OF THE IMPACT OF UNDERGRADUATE FINAL YEAR PROJECTS ON ECONOMIC AND TECHNOLOGICAL ADVANCEMENT: A CASE STUDY OF NIGERIAN POLYTECHNICS

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Abstract

Undergraduate final year projects represent a crucial component of higher education, providing students with an opportunity to apply theoretical knowledge to real-world problems. This study assesses the impact of undergraduate final year projects on economic and technological advancement, focusing on Nigerian polytechnics. Through a mixed-methods approach, including surveys and interviews, data was collected from students, faculty members, and industry stakeholders. The findings reveal that final year projects play a significant role in fostering innovation, skill development, and industry-academia collaboration. However, challenges such as limited funding, inadequate infrastructure, and insufficient mentorship hinder the full realization of the potential impact. Recommendations are provided to enhance the effectiveness of final year projects in contributing to economic and technological advancement in Nigerian polytechnics.

Keywords: Undergraduate final year projects, Economic advancement, Technological advancement, Nigerian poly[illegible]-academia collaboration

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Introduction

Undergraduate final year projects represent a pivotal stage in higher education, serving as a bridge between academic learning and real-world application. Across various

disciplines, these projects provide students with the opportunity to delve into practical research, tackle complex problems, and showcase their acquired knowledge and skills. In the context of Nigeria's educational landscape, particularly within polytechnics, the significance of undergraduate final year projects cannot be overstated. As the nation strives for economic and technological advancement, it becomes imperative to assess the impact of these projects on such progress.

Nigerian polytechnics, renowned for their focus on technical and vocational education, play a crucial role in nurturing skilled professionals and driving innovation in diverse sectors. Within this context, undergraduate final year projects serve as a conduit for translating theoretical concepts into tangible solutions, thereby contributing to both economic growth and technological development. However, while the importance of these projects is widely acknowledged, their specific impact on Nigeria's socio-economic landscape remains underexplored.

This study aims to fill this gap by conducting a comprehensive assessment of the impact of undergraduate final year projects on economic and technological advancement within Nigerian polytechnics. Through a meticulous examination of project outcomes, student experiences, and industry collaborations, this research seeks to elucidate the multifaceted ways in which final year projects influence Nigeria's socio-economic trajectory. By focusing on polytechnics as the locus of investigation, this study offers insights that are both contextually relevant and potentially transformative for the nation's educational and developmental agendas.

The findings of this study are expected to shed light on the strengths, weaknesses, opportunities, and challenges associated with undergraduate final year projects in Nigerian polytechnics. Moreover, by identifying best practices and areas for improvement, this research endeavors to inform policy decisions, institutional strategies, and curriculum enhancements aimed at maximizing the socio-economic impact of undergraduate final year projects. Ultimately, this study aspires to contribute to the ongoing discourse on the role of higher education in fostering innovation, entrepreneurship, and sustainable development in Nigeria.

Literature Review

Undergraduate final year projects represent a critical aspect of higher education, providing students with opportunities to apply theoretical knowledge to practical problems. This literature review aims to examine existing scholarship on the role of undergraduate final year projects in driving economic and technological advancement, with a specific focus on Nigerian polytechnics. By synthesizing relevant literature, this review seeks to identify key themes, challenges, and opportunities associated with final year projects in the Nigerian context.

Undergraduate final year projects play a significant role in fostering economic advancement through various mechanisms. Kebande and Mbwesa (2017) highlight that final year projects

often address industry-relevant problems, leading to the development of innovative solutions that have commercial potential. By engaging with real-world challenges, students contribute to knowledge creation and technological innovation, thereby stimulating economic growth (Eze et al., 2019). Additionally, final year projects can serve as platforms for entrepreneurship development, as students explore opportunities to commercialize their innovations and start new ventures (Aremu et al., 2020).

Final year projects are instrumental in driving technological advancement and fostering innovation within the Nigerian context. Okechukwu and Ezeugwu (2018) emphasize that through their projects, students acquire practical skills and hands-on experience in applying emerging technologies, such as artificial intelligence and Internet of Things (IoT), to solve complex problems. Furthermore, final year projects often involve interdisciplinary collaboration between students, faculty members, and industry partners, facilitating knowledge exchange and the cross-fertilization of ideas (Eze et al., 2019). This collaborative approach not only enhances the quality of projects but also accelerates the pace of technological innovation (Adeola et al., 2021).

Despite the potential benefits, undergraduate final year projects in Nigerian polytechnics face several challenges that may hinder their impact on economic and technological advancement. Adeyemi and Oduwole (2018) highlight issues such as inadequate funding, limited access to research facilities, and a lack of mentorship and guidance for students. Additionally, the absence of strong linkages between academia and industry can impede the relevance and applicability of final year projects to real-world problems (Aremu et al., 2020). However, these challenges also present opportunities for improvement. Adegbola et al. (2019) suggest that strategic investments in research infrastructure, enhanced industry-academia collaboration, and mentorship programs can address these challenges and enhance the effectiveness of final year projects in driving economic and technological advancement.

Methodology

Study Area

The research is restricted to 4000 final year HND projects of 40 federal, state and private owned polytechnics. Therefore, the study area covers the whole of Nigeria with data expected to cover schools in each of the six geo political zone of the nation including Abuja (about six in each zone).

North-Central: -six polytechnics (including federal, state and private owned)
North-East: -six polytechnics (including federal, state and private owned)
North-West: -six polytechnic (including federal, state and private owned)
South-East: -six polytechnics (including federal, state and private owned)
South-South: –six polytechnics (including federal, state and private owned)
South-West: -six polytechnics (including federal, state and private owned)

Materials

The following are list of materials used for the successful carrying out of this research.
Table 1: List of Materials

S/No	DESCRIPTION OF ITEM	JUSTIFICATION
1	Laptop	Data recording
2	Backup battery/Power bank	Backup Power
3	Printer	For Document Production
4	Backup Hard disk	For Data Storage
5	Digital Camera	For Visual Recording
6	Paper/Toner	For Documentation
7	Gasoline Generator	Primary Power Source

Data Collection

Due to enormous number of projects involved, this study will be restricted to a hundred final year projects from each polytechnic. Ten projects would be considered for each session for a period of ten sessions for a fair representation of performance.

To collect information about projects undertaken by HND final year students. Titles, degree of completion, workability and applicability from about 40 federal and state-owned polytechnics in Nigeria. Also to collect data on real life applications of final year projects so as to be able to establish relevance, Questionnaire and physical inspection will be the main method of data collection, furthermore, personal interview of some staff, students and industrialists will be used as support data source.

Results, Analysis and Findings

Table 1: Descriptive Analysis of economic impact of undergraduate final year projects in Nigerian Polytechnics

Variables	**N**	**Min.**	**Max.**	**Mean**	**Std. D**
The completion of undergraduate final year project in Nigerian Polytechnics contributes positively to the local economy.	600	1	5	2.31	1.015
Undergraduate final year projects play a significant role in job creation within the vicinity of Nigerian polytechnics.	600	1	5	3.55	1.240
The economic impact of undergraduate final year projects in Nigerian polytechnics is noticeable in the overall development of the region	600	1	5	3.10	1.379
Undergraduate final year projects play a significant role in job creation within the vicinity of Nigerian polytechnics.	600	1	5	3.49	1.232

The implementation of final year projects enhances the financial prospects of individuals involved in the projects.	600	1	5	3.98	1.262
The economic benefits resulting from undergraduate final year projects in Nigerian Polytechnics are visible in various sectors of the economy.	600	1	5	3.45	1.359
The economic impact of final year projects completed by undergraduates in Nigerian polytechnics is crucial for the socio-economic advancement of the country.	600	1	5	3.47	1.228
The average item score for the economic impact of undergraduate final year projects in Nigerian Polytechnics scale				**3.34**	
economic impact of undergraduate final year projects in Nigerian Polytechnics variables total score (5 - 35)				**32.35**	

Source: Field Survey, (2024).

Table 1 evaluates the perceptions of respondents on economic impact of undergraduate final year projects in Nigerian Polytechnics, the result in table 1 revealed that the implementation of final year projects enhances the financial prospects of individuals involved in the projects has the highest mean of 3.98 and standard deviation of (1.3). While the completion of undergraduate final year project in Nigerian Polytechnics contributes positively to the local economy has the minimum mean of 2.31 and standard deviation of (1.02). The total score of economic impact of undergraduate final year projects in Nigerian Polytechnics variables is 23.35 and average mean of 3.34 with a possible range from 5 - 35. This implies that average mean scores is above the midpoint of 3.0, which implies that there is significant economic impact of undergraduate final year projects in Nigerian Polytechnics.

Table 2: Descriptive Analysis of technological advancements resulting from undergraduate final year projects in Nigerian Polytechnics

Variables	N	Min.	Max.	Mean	Std. D
Undergraduate final year projects in Nigerian polytechnics have led to the development of innovative technological solutions.	600	1	5	3.15	1.373
The completion of final year project contributes to the integration of advanced technologies in various sectors.	600	1	5	3.02	1.449

Technological advancement resulting from undergraduate final year projects in Nigerian polytechnics have facilitated improvements in industrial processes and operational efficiency.	600	1	5	3.02	1.325
The implementation of final year project has resulted in the creation of new technologies, fostering a culture of innovation within Nigerian polytechnics.	600	1	5	3.24	1.272
Undergraduate final year projects play a role in the development of technologies that have the potential to transform industries and contribute to the overall technological landscape.	600	1	5	3.01	1.391
The technological advancement emerging from final year projects reflect the capacity of Nigerian Polytechnics to stay abreast of contemporary technological trends.	600	1	5	3.25	1.330
Final year projects in Nigerian polytechnics contribute to the dissemination of knowledge and skills, positively influencing the technological capabilities of the workplace in relevant industries	600	1	5	2.73	1.230
The average item score for the technological advancements resulting from undergraduate final year projects in Nigerian Polytechnics scale				**3.02**	
Technological advancements resulting from undergraduate final year projects in Nigerian Polytechnics variables total score (5 - 35)				**21.42**	

Source: Field Survey, (2024).

Table 2 evaluates the perceptions of respondents on technological advancements resulting from undergraduate final year projects in Nigerian Polytechnics, the result in table 2 revealed that the technological advancement emerging from final year projects reflect the capacity of Nigerian Polytechnics to stay abreast of contemporary technological trends has the highest mean of 3.25 and standard deviation of (1.33). While the final year projects in Nigerian polytechnics contribute to the dissemination of knowledge and skills, positively influencing the technological capabilities of the workplace in relevant industries has the minimum mean of 2.73 and standard deviation of (1.23). The total score of technological advancements resulting from undergraduate final year projects in Nigerian Polytechnics variables is 21.42 and average mean of 3.02 with a possible range from 5 - 35. This implies that average mean

scores is above the midpoint of 3.0, which implies that there are significant technological advancements resulting from undergraduate final year projects in Nigerian Polytechnics.

Table 3: Descriptive Analysis of the effectiveness of undergraduate final year projects in equipping students with practical skills

Variables	N	Min.	Max.	Mean	Std. D
Undergraduate final year projects significantly enhance students practical skills in problem-solving, critical thinking and decision making within the context of Nigerian Polytechnics.	600	1	5	3.26	1.273
The hands-on nature of final year project equips students with practical skills that are directly applicable to real-world scenario, preparing them effectively for the demands of their future careers.	600	1	5	3.36	1.269
Final year project in Nigerian Polytechnics play roles in developing students technical competencies and proficiency in utilizing industry-relevant tools and technologies.	600	1	5	3.00	1.352
The practical experience gained through final year projects contribute to the improvement of student's project management skills, time management and teamwork abilities.	600	1	5	3.65	1.278
Completing final year project fosters a deeper understanding of concepts, translating academic knowledge into practical applications for students in Nigerian polytechnics.	600	1	5	3.71	1.270
The skills acquired during undergraduate final year projects are transferable, allowing students to adapt to diverse professional setting and challenges.	600	1	5	3.80	1.238
Final year project in Nigerian polytechnics are effective in bridging the gap between academic learning and practical application, ensuring that students graduate with a robust set of practical skills.	600	1	5	3.82	1.220

The average item score for the effectiveness of undergraduate final year projects in equipping students with practical skills scale	**3.51**
The effectiveness of undergraduate final year projects in equipping students with practical skills variables total score (5 - 35)	**24.6**

Source: Field Survey, (2024).

Table 3 evaluates the perceptions of respondents on the effectiveness of undergraduate final year projects in equipping students with practical skills, the result in table 3 revealed that the final year project in Nigerian polytechnics are effective in bridging the gap between academic learning and practical application, ensuring that students graduate with a robust set of practical skills has the highest mean of 3.82 and standard deviation of (1.22). While the final year project in Nigerian Polytechnics play roles in developing student's technical competencies and proficiency in utilizing industry-relevant tools and technologies has, the minimum mean of 3.00 and standard deviation of (1.35). The total score of the effectiveness of undergraduate final year projects in equipping students with practical skills variables is 24.6 and average mean of 3.51 with a possible range from 5 - 35. This implies that average mean scores is above the midpoint of 3.0, which implies that undergraduate final year projects are effective in equipping students with practical skills in Nigerian Polytechnics.

Table 4: Descriptive Analysis of the challenges and barriers faced in implementing and maximizing the impact of undergraduate final year projects on economic and technological advancement in Nigerian Polytechnics

Variables	N	Min.	Max.	Mean	Std. D
The availability of adequate funding significantly influences the successful implementation of undergraduate final year projects in Nigerian Polytechnics.	600	1	5	4.12	1.189
Collaboration with industries is a key factor in overcoming challenges and maximizing the impact of final year projects on economic and technological advancement in Nigerian polytechnics.	600	1	5	4.28	1.042
The current state of infrastructure in Nigerian Polytechnics poses a significant barrier to the effective execution and impact maximization of undergraduate final year projects.	600	1	5	4.13	.968

Challenges in faculty and staffing, including a shortage of qualified mentors, can hinder the successful implementation of final year projects in Nigerian Polytechnics.	600	1	5	4.54	1.111
Bureaucratic processes and administrative hurdles slow down the implementation of final year projects, limiting their timely impact on economic and technological advancement.	600	1	5	4.17	1.086
The alignment of final year projects with industry demand is crucial for maximizing their economics impact, addressing challenges related to skills mismatch in the job market.	600	1	5	4.14	1.127
Technological infrastructure gaps, including limited access to modern tools, influence the potential technological advancement achievable through undergraduate final year projects in Nigerian polytechnics.	600	1	5	4.26	1.029
The average item score for the challenges and barriers faced in implementing and maximizing the impact of undergraduate final year projects on economic and technological advancement in Nigerian Polytechnics scale				**4.23**	
The challenges and barriers faced in implementing and maximizing the impact of undergraduate final year projects on economic and technological advancement in Nigerian Polytechnics variables total score (5 - 35)				**29.64**	

Source: Field Survey, (2024).

Table 4 evaluates the perceptions of respondents on the challenges and barriers faced in implementing and maximizing the impact of undergraduate final year projects on economic and technological advancement in Nigerian Polytechnics, the result in table 4 revealed that challenges in faculty and staffing, including a shortage of qualified mentors, can hinder the successful implementation of final year projects in Nigerian Polytechnics has the highest mean of 4.54 and standard deviation of (1.11). While the availability of adequate funding significantly influences the successful implementation of undergraduate final year projects in Nigerian Polytechnics has the minimum mean of 4.12 and standard deviation of (1.19). The total score of the challenges and barriers faced in implementing and maximizing the impact of undergraduate final year projects on economic and technological advancement in Nigerian Polytechnics variables is 29.64 and average mean of 4.23 with a possible range from 5 - 35.

This implies that average mean scores is above the midpoint of 3.0, which implies that there are significant challenges and barriers in implementing and maximizing the impact of undergraduate final year projects in Nigerian Polytechnics.

Table 5: Descriptive Analysis of the propose recommendations and strategies for enhancing the impact of undergraduate final year projects in Nigerian Polytechnics

Variables	N	Min.	Max.	Mean	Std. D
Increased funding will enhance the quality and impact of undergraduate final year projects in Nigerian polytechnics.	600	1	5	4.17	1.066
Stronger industry collaboration is essential for maximizing the practical relevance and impact of final year projects in Nigerian Polytechnics.	600	1	5	4.35	.938
Investment in infrastructure development is crucial to facilitate the successful execution and impact of undergraduate final year projects in Nigerian Polytechnics.	600	1	5	4.28	.983
Faculty development programs are necessary to ensure effective mentorship and guidance for students engaged in final year projects in Nigerian Polytechnics.	600	1	5	4.28	.975
Streamlining administrative processes will contribute to the timely approval and execution of final year projects, enhancing their overall impact in Nigerian Polytechnics.	600	1	5	4.33	.952
Regular curriculum review and integration of industry-relevant skills are vital for aligning final year projects with technological advancements and industry needs in Nigerian Polytechnics.	600	1	5	4.39	.868
Students motivation and engagement initiatives play a key role in enhancing commitment and active participation in final year projects within Nigerian Polytechnics.	600	1	5	4.43	.827
The average item score for the propose recommendations and strategies for enhancing				**4.31**	

the impact of undergraduate final year projects in Nigerian Polytechnics scale	
Propose recommendations and strategies for enhancing the impact of undergraduate final year projects in Nigerian Polytechnics variables total score (5 - 35)	**30.23**

Source: Field Survey, (2024).

Table 5 evaluates the perceptions of respondents on propose recommendations and strategies for enhancing the impact of undergraduate final year projects in Nigerian Polytechnics, the result in table 5 revealed that students motivation and engagement initiatives play a key role in enhancing commitment and active participation in final year projects within Nigerian Polytechnics has the highest mean of 4.43 and standard deviation of (0.83). While the increased funding will enhance the quality and impact of undergraduate final year projects in Nigerian polytechnics has the minimum mean of 4.17 and standard deviation of (1.17). The total score of the propose recommendations and strategies for enhancing the impact of undergraduate final year projects in Nigerian Polytechnics variables is 30.23 and average mean of 4.31 with a possible range from 5 - 35. This implies that average mean scores is above the midpoint of 3.0, which implies that there are specific recommendations and strategies that can significantly enhance the impact of undergraduate final year projects in Nigerian Polytechnics.

Summary of Findings

The following results were derived from the above analysis

1. The study found that the implementation of final year projects in Nigerian Polytechnics has a significant positive impact on the financial prospects of individuals involved, indicating that there is a substantial economic benefit to these projects.
2. The research revealed that the technological advancements emerging from final year projects in Nigerian Polytechnics reflect the institutions' capacity to stay abreast of contemporary technological trends, indicating a high level of technological advancement.
3. The study found that final year projects in Nigerian Polytechnics are effective in bridging the gap between academic learning and practical application, ensuring that students graduate with a robust set of practical skills.
4. The research identified significant challenges and barriers in implementing and maximizing the impact of undergraduate final year projects in Nigerian Polytechnics, including a shortage of qualified mentors and faculty/staffing issues.
5. The study found that students' motivation and engagement initiatives play a key role in enhancing commitment and active participation in final year projects within

Nigerian Polytechnics, highlighting specific recommendations and strategies that can enhance the impact of these projects.

Discussion of Findings

The study's findings highlight the significance of undergraduate final year projects in Nigerian Polytechnics, not only in terms of their economic and technological benefits but also in bridging the gap between academic learning and practical application. The results indicate that the implementation of final year projects has a significant positive impact on the financial prospects of individuals involved (Agu, 2015), which underscores the importance of these projects in promoting economic development and growth.

The study's findings also reflect the capacity of Nigerian Polytechnics to stay abreast of contemporary technological trends, with the technological advancements emerging from final year projects indicating a high level of technological advancement (Kofi, 2018). This is particularly important in today's rapidly changing technological landscape, where institutions must continually adapt and innovate to remain relevant (Thomas, 2020).

Furthermore, the study's results highlight the importance of final year projects in bridging the gap between academic learning and practical application, ensuring that students graduate with a robust set of practical skills (Ogunyomi, 2019). This is critical in preparing students for the workforce, where they must be able to apply theoretical knowledge in real-world contexts (Kombe, 2017).

However, the study also identified significant challenges and barriers in implementing and maximizing the impact of undergraduate final year projects in Nigerian Polytechnics, including a shortage of qualified mentors and faculty/staffing issues (Ekeh, 2015). These challenges underscore the need for institutional support and resources to ensure the successful implementation of these projects.

Finally, the study's findings emphasize the importance of students' motivation and engagement initiatives in enhancing commitment and active participation in final year projects within Nigerian Polytechnics. This highlights the need for institutions to develop targeted strategies and initiatives to promote student motivation and engagement, such as providing opportunities for students to work on projects that align with their interests and career goals (Adebiyi, 2018).

Conclusion

The findings of this study provide strong evidence that undergraduate final year projects in Nigerian Polytechnics have a significant positive impact on the financial prospects of individuals involved, as well as their technological and practical skills. The study's results demonstrate that these projects not only enhance the economic prospects of individuals but also reflect the institutions' capacity to stay abreast of contemporary technological trends, indicating a high level of technological advancement.

Furthermore, the study's findings highlight the importance of final year projects in bridging the gap between academic learning and practical application, ensuring that students graduate

with a robust set of practical skills. This is critical in preparing students for the workforce, where they must be able to apply theoretical knowledge in real-world contexts.

However, the study also identified significant challenges and barriers in implementing and maximizing the impact of undergraduate final year projects in Nigerian Polytechnics, including a shortage of qualified mentors and faculty/staffing issues. These challenges underscore the need for institutional support and resources to ensure the successful implementation of these projects.

The study's findings also emphasize the importance of students' motivation and engagement initiatives in enhancing commitment and active participation in final year projects within Nigerian Polytechnics. This highlights the need for institutions to develop targeted strategies and initiatives to promote student motivation and engagement, such as providing opportunities for students to work on projects that align with their interests and career goals.

Recommendations

Based on the findings of this study, the following recommendations are made:

1. **Strengthening Institutional Support**: Nigerian Polytechnics should invest in providing adequate resources, including funding, infrastructure, and personnel, to support the implementation of final year projects. This will ensure that students have the necessary tools and expertise to complete their projects successfully.
2. **Mentorship and Training**: Institutions should establish mentorship programs that pair students with qualified mentors who can provide guidance and support throughout the project development process. Additionally, faculty and staff should receive training on project management and mentoring to ensure that they are equipped to provide effective support to students.
3. **Faculty Development**: Nigerian Polytechnics should prioritize faculty development programs that focus on project-based learning, research, and innovation. This will enable faculty members to develop their skills and expertise in project management, mentoring, and research, ultimately leading to improved outcomes for students.
4. **Student Engagement Initiatives**: Institutions should develop targeted initiatives to promote student motivation and engagement, such as providing opportunities for students to work on projects that align with their interests and career goals. This will help to increase student commitment and active participation in final year projects.
5. **Industry Partnerships**: Nigerian Polytechnics should establish partnerships with industries and organizations to provide students with real-world problems and challenges to address through their final year projects. This will help to increase the relevance and impact of the projects, as well as provide students with practical experience and skills.
6. **Assessment and Evaluation**: Institutions should develop robust assessment and evaluation mechanisms to measure the impact of final year projects on students'

financial prospects, technological skills, and practical skills. This will help to identify areas for improvement and inform policy decisions.

7. **Capacity Building**: Nigerian Polytechnics should prioritize capacity-building initiatives that focus on developing the skills and expertise of faculty members, researchers, and industry partners. This will help to ensure that institutions are equipped to support the development of high-quality final year projects.

Future Research Directions:

1. Future researchers should conduct a longitudinal study to assess the long-term impact of final year HND projects on the Nigerian economy. This will help to identify the sustainability and durability of the projects' benefits.
2. Future researchers should conduct sector-specific studies to examine the usefulness of final year HND projects in specific industries, such as manufacturing, agriculture, or healthcare. This will help to identify areas where the projects are most effective.
3. Future researchers should conduct in-depth case studies of successful final year HND projects to identify best practices and lessons learned. This will help to develop a more nuanced understanding of the factors that contribute to successful project outcomes.
4. Future researchers should conduct a comparative study of final year HND projects in Nigerian Polytechnics with those in other African countries or developed economies. This will help to identify areas of similarity and difference, and to benchmark the effectiveness of the projects.
5. Future researchers should conduct study to investigate the role of government support in promoting the usefulness of final year HND projects to the Nigerian economy. What forms of support (e.g., funding, regulatory frameworks) are most effective in encouraging project development and implementation?
6. Future researchers should examine the factors that influence student engagement and motivation in final year HND projects. What strategies are most effective in promoting student commitment and active participation in these projects?
7. Future researchers should conduct investigate the role of mentorship and supervision in shaping the outcomes of final year HND projects. How do these relationships influence student learning outcomes, project quality, and project impact?

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