

The Impact of AI-Driven Educational Simulations and Ideation With AI on Technopreneurship Education Learning Objectives: The Integration of ChatGPT in Education

Osa Omar Sharif
Telkom University

Ivan Diryana Sudirman
Bina Nusantara University

This research analyzes the effects of implementing Artificial Intelligence (AI) technologies, particularly ChatGPT for AI-DES (AI-Driven Educational Simulations) and Ideation with AI (Artificial Intelligence), on the learning outcomes of a technopreneurship course taught at a university in Bandung. Data was collected from a sample of 128 students who participated in the technopreneurship course. The results suggest that the application of AI-DES and Ideation with AI has an interesting effect on Lecture, thus supporting the usefulness of AI technologies as valuable instruments to help improve classroom learning. The finding indicates the application of Ideation with AI tends to influence different learning processes. The results of studies show that lectures hold an important role in creating favorable project outcomes and facilitating students' accomplishing learning objectives. The research findings highlight the importance of implementing AI technology into technopreneurship education and using Lecture as an important facilitator for achieving learning outcomes.

Keywords: AI-Driven educational simulations (AI-DES), ideation with AI, technopreneurship education, ChatGPT integration, learning objectives

INTRODUCTION

In the past decade, Indonesia has achieved significant achievements in its attempt to encourage a culture of innovation and nurture an ecosystem of entrepreneurial individuals, which has had a major effect on the entrepreneurial climate within the country. In diverse social and economic contexts, there has been a greater emphasis on stimulating entrepreneurship due to the important contributions contributed by entrepreneurs in driving economic growth, creating employment opportunities, and pushing technological advancements.(Acs & Szerb, 2007; Macke, 2018). As a result, many colleges and universities nationwide have started courses and assistance centers to provide young entrepreneurs with the expertise, abilities, and perspectives to succeed in the fiercely competitive modern business environment.(Berry et al., 2001; Tambunan, 2008).

The teaching of technopreneurship in the school curriculum is an important decision. Technopreneurship is a concept that combines innovative technology and business expertise to successfully

create and run profitable new ventures. This revolutionary approach to education and training is known for its balanced attention to fundamental business principles and the strategic usage of technology to promote invention and disrupt markets. The discipline of entrepreneurship attracts considerable interest from students and faculty members..(Ndagi & Salihu, 2019; Tang & Yeo, 1995).

In line with the continuous growth of the business circumstances, technological development has seen an unprecedented rise in the powers of artificial intelligence (AI). Of a number of new developments in artificial intelligence, ChatGPT emerges as an important breakthrough thanks to its amazing capability in natural language processing and its power to create text-based answers that closely resemble those produced by humans. The use of ChatGPT and similar artificial intelligence (AI) technologies are becoming popular across different industries, including customer service, content generation, and data analytics (Ray, 2023). Still, the quick progress of artificial intelligence (AI) and its broad deployment have also provoked concerns among scholars and academics. Ethical concerns, such as the possibility of AI being misused for fraudulent purposes, have resulted in the implementation of preventative measures and the beginning of discussions regarding the responsible deployment of AI. Yet, technology's dynamic and advancing aspects require an adaptable and innovative strategy for effectively employing artificial intelligence (AI) in classrooms (Cotton et al., 2023; Sullivan et al., 2023).

The Technopreneurship course available at a university in Bandung acts as a creative example amid a global framework where entrepreneurship is gaining greater importance and artificial intelligence technology keeps developing. This course harnesses the exciting powers of artificial intelligence (AI) to further improve students' learning process while assisting their progress toward entrepreneurship. Ideation with artificial intelligence (AI) and AI-driven educational simulations are regarded as essential elements within the educational context referred to as AI-DES.

The process of AI ideation includes using ChatGPT for a series of brainstorming sessions, where students are urged to create creative and different ideas for mobile applications. The artificial intelligence acts as a well-informed and objective partner, offering insights and suggestions about technological advancement. The adoption of AI-driven ideation methods not only accelerates the creation of ideas within individuals, but it additionally encourages a mindset of exploration and enables receiving of beneficial suggestions for enhancing these ideas, especially in the classroom.

Adding AI-DES (AI-Driven Educational Simulations) brings a fascinating and complimentary aspect to the Ideation with AI course. In this simulation, ChatGPT is an investor, while students pitch their business ideas to ChatGPT for feedback and assessment. This interactive simulation offers students with an excellent chance to gain practical expertise in pitching and negotiating by mimicking real-world interactions with investors. Immersive experiences like this assist students in preparing for the challenges of the business environment by providing them more than just theoretical knowledge. The primary goals of the Technopreneurship course cover three key areas: understanding the basic principle of technopreneur, applying the use of technology, and applying the basics of fundraising and negotiation. Lectures and project-based learning represent a vital part of the course. This research aims to examine the impact of lectures, project-based learning, and the utilization of AI tools (Ideation with AI and AI-DES) on students' learning outcomes within the context of this revolutionary teaching approach.

The primary objective of this study is to examine the impact of introducing AI tools, such as Ideation with AI and AI-DES, within the Technopreneurship lessons on students' learning outcomes. This study aims to look into the relationships between lectures, project-based learning, and the utilization of AI technologies in order to acquire useful insights into the success of AI-based methods of instruction within the framework of technopreneurship education. This initiative aims to bring attention to the discourse around innovative pedagogical approaches that utilize AI technology in an appropriate way, to facilitate entrepreneurial skills growth among students.

LITERATURE REVIEW

The growing popularity of artificial intelligence (AI) in our daily lives has resulted in significant interest in tools such as GPT-3 and ChatGPT due to their exceptional functionality. Zhai (Zhai, 2022) stresses the

widespread adoption of artificial intelligence (AI) into several domains, which is especially apparent in the use of GPT-3 and ChatGPT. The imminent repercussions of artificial intelligence on higher education has grown more and more apparent. The likely effect of Artificial General Intelligence (AGI) on society is an issue with growing importance and relevance in the years to come. Artificial intelligence (AI) has the potential to have a major effect on white-collar knowledge work and employment. Even so, Zhai underlines the importance of careful study and active involvement with the fast-growing AI domain to improve higher education's learning, teaching, and assessment methods.

Baidoo-Anu (Baidoo-Anu & Owusu Ansah, 2023) highlight the transformative potential of generative artificial intelligence, such as ChatGPT, in the context of education. The widespread use of this technology within educational institutions has resulted in the adoption of restrictions and software development for detecting its usage. They express their support of adopting the changing educational environment and utilizing artificial intelligence (AI) technologies. The addition of Microsoft's ChatGPT indicates a growing possibility of generative AI becoming widely utilized in the future. In the generative artificial intelligence (AI) field, instructors must acquire the necessary skills for successfully applying AI technologies to facilitate examinations of outstanding quality, therefore enhancing students' learning experiences.

The idea involves using generative artificial intelligence (AI) tools within educational institutions to provide students with the necessary skills to thrive in an AI-driven industrial environment, securing their future successes. The passage offers significant inquiries relative to the use of ChatGPT in the framework of student learning, the delivery of AI training to students as well as instructors, the inclusion of AI tools into teacher education programs, and the prevention of challenges related to the digital divide. The statement underlines the necessity of lawmakers, academics, educators, and technology experts working together and participating in dialogue in successfully emerging AI tools into the realm of education, with the long-term objective of improving student learning outcomes in a manner that is both reliable and useful.

In compliance with the fundamental principles of technopreneurship, a university in Bandung is attempting to implement ChatGPT into its technopreneurship program. The institution tries to equip students for an AI-centric corporate landscape through integrating generative AI tools like ChatGPT into the context of learning. This initiative aligns with the entrepreneurial mindset that encourages changes and innovation. The objective of this integration is to increase the future accomplishments of students and improve the capacity of ChatGPT to enhance educational outcomes and developing innovative thinking.

Technopreneurship spans the identification and analysis of technical opportunities, the pursuit of creative ideas, the establishment of scalable business models, and the integration of technology into all facets of entrepreneurial activity. Technopreneurship is commonly linked to industries that are driven by technology, such as information technology, biotechnology, clean energy, artificial intelligence, and digital media. Technopreneurship is an approach that advocates for the cultivation of an adaptable, agile and eager entrepreneurial mentality, which utilizes technology to improve the well-being of society and generate economic growth (Abbas, 2018; Scarlat, 2014; Soomro & Shah, 2021).

In the technopreneurship course offered by this university, students are obliged to engage in finishing of their final project, which includes the formulation of an extensive strategy for the creation of a mobile application. The first phase of the process comprises ideation, throughout which students actively search for original concepts that can successfully satisfy the demands of the intended customer base. ChatGPT is used as a tool to aid in the creation of ideas by evaluating and tackling market challenges that have been discovered. Also, ChatGPT is vital in the simulation of interactions with potential investors, drawing inspiration from the popular television program "Dragon's Den." In this simulation, ChatGPT assumes the position of a dragon investor, so offering students with a valuable chance for honing their pitching skills.

ChatGPT serves as an instrument for aiding estimation of expenditures associated with application development and the building of skilled teams, among other tasks within the area of technopreneurship. Incorporating ChatGPT into the technopreneurship course offers several advantages, including promoting innovation, enhancing project ideas, and providing a realistic simulation of investor contacts. The versatile utilization of ChatGPT throughout all facets of the curriculum improves students' entrepreneurial learning experience and equip them with essential skills for their forthcoming pursuits.

The primary learning objectives pursued by students in the technopreneurship course are three components: understanding the basic principle of technopreneur, applying the use of a technology, and applying the basic of fundraising and negotiation. Additionally, students strive to improve their expertise in technology application skills by participating in practical experiences and performing various projects. Participants acquire the knowledge and skills necessary to successfully use an array of technology tools and resources to cultivate inventive market solutions. Students understand the value of adopting digital transformation within the entrepreneurial domain via focusing the ability to adapt rapidly changing technology advancements. In the end, the curriculum places significant emphasis on cultivating negotiation skills and formulating effective fundraising methods.

Lectures and projects are the predominant strategies for learning employed in numerous academic courses to facilitate achieving of learning objectives. Students are provided with a well-organized and thorough educational experience covering several aspects of technopreneurship, including integrating technology and entrepreneurship, market analysis, and commercial strategies, which are delivered through regular lectures. Lectures play a crucial role in facilitating the retention of fundamental theories and principles, hence establishing a strong groundwork for students to grasp the complex concepts associated with technopreneurship (Astuty et al., 2023; Lie et al., 2023).

Projects, play a crucial part in improving students' abilities in using technology as well as negotiation and funding strategies. Practical projects allow students to successfully apply their learned skills and knowledge within real-world contexts. Students utilize ChatGPT as a means to explore new ideas and simulate investor interactions while creating and coming up with strategies for mobile apps. This interactive event allows students to enhance their ability in effectively using technology and methods for negotiation.

Based on the findings of the literature analysis, this study includes two different independent variables, namely AI-DES and Ideation with AI. AI-DES, also known as AI-Driven Educational Simulations, comprises an independent variable where ChatGPT is utilized to recreate investor interactions in the setting of the technopreneurship course. The adoption of ChatGPT in the procedure of ideation involving artificial intelligence implies its application in helping students in creating of mobile application ideas that address specific issues prevalent within their target market. The study focuses its efforts on two distinct independent factors to determine their impact on the outcomes of course learning.

This study includes two intervening factors, respectively Lecture and Project. The lecture format represents the conventional approach to learning, in which teachers teach technopreneurship concepts to students through direct communication. In the setting of this discussion, the term "Project" relates to the actual efforts done by students, especially in the subject of mobile application development, as the final stage of their course. The presence of these two intervening variables helps the accomplishment of learning objectives by serving as facilitators between the independent variables (AI-DES and Ideation with AI) and the course's learning outcomes.

The learning objective serves as the dependent variable in this study. The variable in consideration includes the three learning objectives of the technopreneurship course: a thorough understanding of technopreneurship principles, adeptness in the application of technology, and competency in negotiation and fundraising tactics. The learning objective includes the desired outcomes that students hope to achieve due to their engagement in the course. These objectives are formed by two independent factors, namely AI-DES and Ideation with AI, and two intervening variables, Lecture and Project. In the technopreneurship course provided by the university, students are required to complete a final project that requires creating an in-depth strategy for developing a mobile application. The initial stage of the process contains ideation, through which students actively pursue fresh ideas to effectively meet the demands of the intended customer base. ChatGPT is utilized to facilitate the creation of ideas by answering market challenges that have been discovered. In addition, the utilization of ChatGPT plays a key part in replicating interactions with investors in the future, drawing inspiration from the popular television program "Dragon's Den." In this simulation, ChatGPT assumes the position of a dragon investor, so providing students with a valuable opportunity to engage in pitching exercises.

Thus, this study has two intervening variables: Lecture and Project. Lecture represents the traditional lecture-based learning strategy in which instructors deliver technopreneurship concepts to students.

Meanwhile, Project refers to the practical activities carried out by students, most notably in planning mobile application development as their final project. These two intervening variables aid in achieving learning objectives by acting as mediators between the independent variables (AI-DES and Ideation with AI) and the course learning outcomes. The dependent variable in this study is learning objective. This variable includes the three learning objectives of the technopreneurship course: comprehension of technopreneurship concepts, proficiency in technological application, and proficiency in negotiation and funding strategies. The learning objective represents the ultimate goals that students hope to achieve through the course, and it is influenced by both independent variables (AI-DES and Ideation with AI) and intervening variables (Lecture and Project). Based on the literature review, the hypothesis for this research is as follows:

H1: The utilization of AI-DES in the technopreneurship course positively impacts the Lecture.

H2: The utilization of AI-DES in the technopreneurship course positively impacts the Project.

H3: The utilization of Ideation with AI in the technopreneurship course positively influences the Lecture.

H4: The utilization of Ideation with AI in the technopreneurship course positively influences the Project.

H5: Lecture in the technopreneurship course positively impacts the Project.

H6: Lecture in the technopreneurship course positively impacts the Learning Objective.

H7: Project in the technopreneurship course positively impacts the Learning Objective.

METHODOLOGY

This study will use a quantitative analysis method to look into the relationships between variables and assess the suggested hypotheses. The research will apply a cross-sectional method, where data will be collected from a representative sample of students currently participating in a technopreneurship course at a university in Bandung.

Data collection includes a questionnaire containing factors intended to quantify the use of AI-DES and Ideation with AI, coupled students' judgments regarding the usefulness of Lecture and Project elements within the course. Moreover, the questionnaire will assess the level to which students have achieved the intended learning outcomes. Once the data has been gathered, it goes through preparation steps to eliminate duplicate data and address any cases of missing data. The data obtained will then go through analysis using the method of Partial Least Squares Structural Equation Modeling (PLS-SEM). Partial Least Squares Structural Equation Modeling (PLS-SEM) is a suitable method for evaluating complex relationships, in particular when dealing with limited sample sizes. As a result, it is a suitable approach for the current study. The specification of the structural model, which outlines the interactions among the variables, will be undertaken. The proposed model will consider the direct impacts of AI-DES and Ideation with AI on learning outcomes while examining the mediating impacts of Lecture and Project.

A mediation study will be conducted to examine the indirect effects of AI-DES and Ideation with AI on learning objectives through the mediating variables of Lecture and Project. This study aims to assess the importance of both direct and indirect effects, focusing on the potential influence of AI-DES and Ideation with AI on learning objectives. Also, the study seeks to determine if Lecture and Project activities mediate these relationships. The findings of the analysis will be analyzed and discussed concerning the stated research goals.

RESULT AND DISCUSSION

This section provides a discussion on the research findings that analyzes the utilization of AI technology within the scope of a technopreneurship course at a university located in Bandung. A total of 128 respondents were involved in the study and answered questions on the questionnaire. The replies provided by the participants revealed important findings for researchers regarding the application of AI-DES and Ideation with AI, as well as their thoughts of the effectiveness of Lecture and Project approaches. This section includes an in-depth examination of the data using Partial Least Squares Structural Equation Modeling (PLS-SEM), having emphasis on evaluating the interactions among variables and evaluating the validity of the suggested hypotheses. This detailed analysis aims to further develop our understanding of the effect of artificial intelligence (AI) on learning goals and the respective roles of lectures and projects within the educational system.

TABLE 1
CONSTRUCT VALIDITY RESULTS

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
AI-DES	0.861	0.861	0.935	0.878
Ideation with AI	0.849	0.851	0.93	0.868
Learning Obj	0.889	0.905	0.931	0.819
Lecture	0.837	0.842	0.925	0.86
Project	0.851	0.863	0.93	0.87

As laid out in Table 1, the construct validity results reveal the internal consistency and reliability of the assessing scales applied for evaluating the constructs in the research. Cronbach's Alpha is a measure of statistics applied to assess the internal consistency of a scale or instrument. It is measured on a scale from 0 to 1, wherein higher values suggest increased reliability. The Composite reliability (rho_A) quantifies the internal consistency and dependability of the constructs, with values above 0.7 considered desirable. The findings relating to construct validity show that the evaluation scales utilized to evaluate AI-DES, Ideation with AI, Learning Objectives, Lecture, and Project indicate high reliability and consistency and robust convergent validity.

TABLE 2
VIF RESULT

	VIF
AI-DES2	2.33
Brainstorming1	2.189
Brainstorming2	2.189
LO1	3.361
LO2	2.462
LO3	2.494
Lecture1	2.076
Lecture2	2.076
Project1	2.212

	VIF
Project2	2.212
AI-DES1	2.33

The extraction of Variance Inflation Factor (VIF) values is used to evaluate the amount of similarity among predictor variables in the research. Variance Inflation Factor (VIF) values over a threshold of 5 suggest a likelihood of major issues related to multicollinearity. This condition can undermine the reliability of regression conclusions and make them more challenging to interpret. VIF values below 5 are generally considered favorable as they indicate no evidence of significant multicollinearity. All of the variance inflation factor (VIF) values in the obtained findings are below the threshold of 5, confirming the absence of serious problems associated to high collinearity across the predictor variables. It also suggests that the predictor variables have a weak correlation with one another. This implies that the model exhibits a high degree of reliability and readability.

**TABLE 3
MODEL FIT**

	Saturated Model	Estimated Model
SRMR	0.067	0.067
d_ ULS	0.292	0.294
d_ G	0.468	0.47
Chi-Square	353.422	354.155
NFI	0.747	0.746

The model fit in Table 3 assesses the range of fit between the estimated and saturated models. The fit indices provide a way to assess the degree of fit between the estimated model and the observed data. A lower SRMR score indicates a better fit between the observed data and the proposed model. In the current instance, the SRMR value for both the saturated and estimated models is 0.067. This implies that the computed model has a strong fit to the observed data. The saturated model displays a d ULS (unweighted least squares) value of 0.292, whilst the estimated model has a slightly higher value of 0.294. Despite the small differences, the results indicate that the estimated model remains offering reasonably fair estimates. Both the saturated model and the estimated model have a d G value of 0.47. This suggests that the d G fit of the estimated model is about similar to that of the saturated model.

The NFI index value for the saturated and estimated models is around 0.746, indicating that the estimated model closely fits the data. The results of the model fit analysis indicate that the estimated model has a good with the observed data, effectively representing the underlying patterns and characteristics of the data.

**TABLE 4
PATH COEFFICIENT RESULTS**

	AI-DES	Ideation with AI	Learning Obj	Lecture	Project
AI-DES				0.607	-0.027
Ideation with AI	0.873			0.234	0.146
Learning Obj					
Lecture			0.539		0.778
Project			0.246		

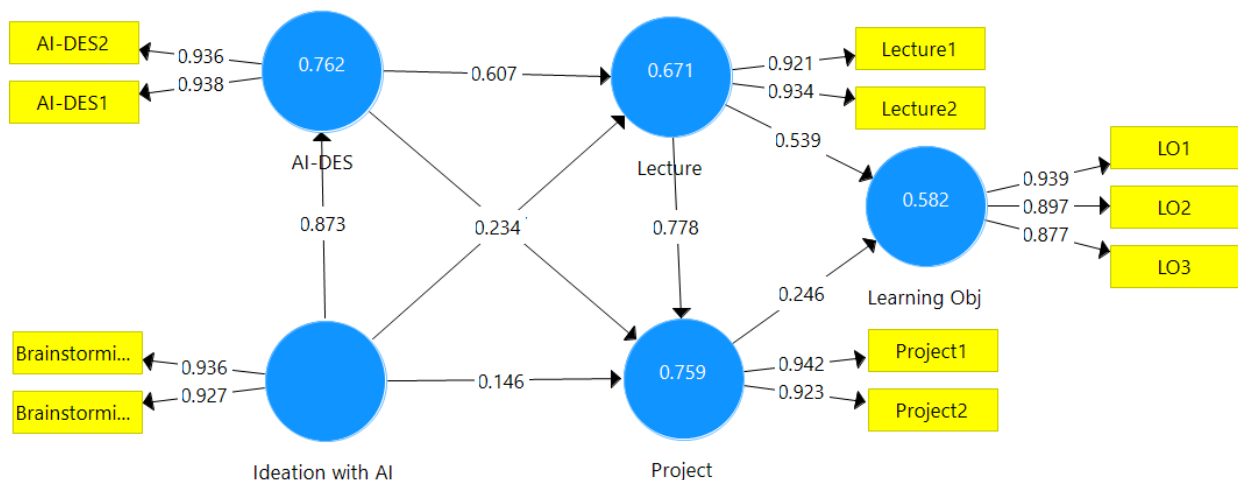
The path coefficients given in Table 4 yield important insights into the interactions among the elements in the research model. The utilization of AI-DES (Artificial Intelligence-Driven Educational Simulation) within the setting of the technopreneurship course shows a substantial and beneficial relationship with the effectiveness of lectures in aiding the fulfillment of learning objectives. This is supported by a path coefficient of 0.607. This implies that the integration of AI-DES into the educational process produces positive effects on the effectiveness of lectures in facilitating students' attainment of the intended learning objectives.

Yet, the path coefficient between AI-DES and Project displays a coefficient of approximately zero (-0.027), implying a weak or insignificant relationship. This means that the integration of AI-DES might not significantly affect the project's efficacy in achieving the intended learning objectives. Further study is required to examine the fundamental mechanisms leading to this weak correlation and identify relevant variables that influence the relationship between AI-DES and the project's achievement. The path coefficient of 0.873, which shows a strong and positive interaction, reveals an important link between the use of Ideation with AI to generate mobile application ideas and the adoption of AI-DES in the technopreneurship course. This discovery illustrates the importance of combining AI-powered idea generating methods as an initial step towards harnessing AI-DES for improved learning experiences.

Also, the observed positive path coefficients of 0.234 between Ideation with AI and Lecture, and 0.146 between Ideation with AI and Project, suggest the positive effect of using Ideation with AI in generating ideas for mobile applications on the success of both Lecture and Project to encourage students' achievement of learning objectives. It also suggests that the inclusion of AI-powered ideation processes benefits the overall learning process, thus boosting the effectiveness of educational methods.

Moreover, the substantial path coefficient of 0.778 discovered between Lecture and Learning Objectives emphasizes the important effect of Lecture on facilitating students' advancement along the intended goals of learning. The observed correlation shows that the Lecture portion plays a substantial role in contributing to the accomplishment of learning outcomes within the technopreneurship course. The path coefficient of 0.246, which illustrates an association between Project and Learning Objectives, reveals the project's positive effect on students' progress toward achieving the learning goals. While the impact may be somewhat smaller compared to traditional lectures, this outcome stresses the need to add well-designed project-based activities into the course curriculum. The diagram of the research design can be viewed in Figure 1.

**FIGURE 1
PATH DIAGRAM**



Within the confines of the technopreneurship course, the path coefficients demonstrate the interactions among AI-DES, Ideation with AI, Lecture, Project, and Learning Objectives. The findings illustrate the importance of merging AI-powered ideation techniques with AI-DES to enhance the effectiveness of teaching methods and help students accomplish their learning goals. Yet, due to the relatively weak relationship between AI-DES and Project, additional study is required to determine the optimal way to use AI-DES in the environment of project-based learning. These findings complement to the existing body of knowledge regarding the application of AI technology in the field of education. Furthermore, these findings carry significant implications for instructional methods and the development of courses in the technological entrepreneurship field.

**TABLE 5
PATH COEFFICIENTS STATISTICAL ANALYSIS**

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ((O/STDEV))	P Values
AI-DES -> Lecture	0.607	0.611	0.13	4.668	0
AI-DES -> Project	-0.027	-0.019	0.126	0.216	0.829
Ideation with AI -> AI-DES	0.873	0.87	0.029	29.975	0
Ideation with AI -> Lecture	0.234	0.227	0.127	1.844	0.066
Ideation with AI -> Project	0.146	0.138	0.109	1.345	0.179
Lecture -> Learning Obj	0.539	0.54	0.134	4.037	0
Lecture -> Project	0.778	0.775	0.082	9.459	0
Project -> Learning Obj	0.246	0.246	0.137	1.804	0.072

Results of the hypothesis testing and statistical analysis for the path coefficients are shown in Table 5. T-statistics are used to evaluate the importance of each path by measuring the relationship’s magnitude contrasted to the standard deviation of the estimate. The statistical analysis results reveal that both AI-DES and Ideation with AI have a statistically significant impact on Lecture, which plays a vital part in fulfilling learning objectives. Even so, it seems that AI-DES has a small impact on the effectiveness of projects. Additional research is necessary to have a comprehensive understanding of the potential implications of integrating AI into the ideation processes within the contexts of lectures and projects. Nevertheless, the study’s results underline the value of Lecture and Project to enhance students’ learning outcomes within the discipline of technopreneurship education.

**TABLE 6
R-SQUARE**

	R Square	R Square Adjusted
AI-DES	0.762	0.76
Learning Obj	0.582	0.575
Lecture	0.671	0.665
Project	0.759	0.753

The R-square values provide useful insights into the degree of how the independent factors contribute to the variation observed in the dependent variable. The R-square and adjusted R-square coefficients suggest that the combination of independent variables (AI-DES, Ideation with AI, Lecture, and Project) greatly contribute to interpreting the variation observed in Learning Objectives, AI-DES, Lecture, and

Project. These results stress the important nature of the variables included when forecasting and understanding the variables that influence students' learning successes and the adept use of AI technologies in the technopreneurship program.

The investigation of the data offers helpful insights into the interactions among the factors within the scope of technopreneurship education. The findings reveal considerable positive connections between the use of AI-DES and Lecture, as well as between Ideation with AI and Lecture. These results mean that the integration of AI technologies, such as ChatGPT, may significantly improve the success rate of Lecture in helping students' learning goals.

Different results are found while analyzing the correlation between AI-DES and Project. The path coefficient exhibits an inadequate association, and the T-statistic lacking statistical significance, demonstrating that the impact of AI-DES on project effectiveness is low. This discovery suggests that while AI-DES may have advantages in certain areas of the technopreneurship course, its influence on project development and the accomplishment of learning objectives through projects may be negligible.

The statistical analysis showed no significant correlations between Ideation with AI and Lecture, as well as Ideation with AI and Project, despite the presence of substantial favorable relationships. While the relationships observed exhibit certain favorable patterns, it is important to keep in mind the sample size or data acquired may not have been sufficient for reaching definitive conclusions. It is essential to recognize that implementing AI-driven ideation and AI-DES within the technopreneurship program constitutes a groundbreaking methodology. Nevertheless, more investigation employing bigger sample numbers is needed to fully understand their impact on both Lecture and Project aspects.

Additionally, the obvious positive relationship between Lecture and Learning Objectives highlights the important role of lectures in promoting students' comprehension and execution of technopreneurship concepts, harnessing technology, and strategies for negotiation and obtaining finance. The substantial impact of lectures on learning outcomes indicates that lectures play a crucial role in fostering students' understanding and skill in the area of technopreneurship. The strong positive relationship between Lecture and Project and the moderate positive relationship between Project and Learning Objectives offers encouragement for the idea that project-based learning complements lectures and enhances the attainment of learning objectives. Projects provide students with practical experience in the application of theoretical concepts acquired through lectures, as well as the cultivation of crucial skills necessary for technopreneurship.

CONCLUSION

Based on the results of the hypothesis testing and statistical analysis, the conclusions regarding each hypothesis are as follows:

- Hypothesis 1: Based on the study conducted, it can be concluded that there is a solid positive link between the AI-DES and Lecture variables, as indicated by a significant T-statistic of 4.668 ($p < 0.001$). This study's results show that adding AI-DES into the technopreneurship course produces considerable and favorable outcomes in terms of lecture delivery and effectiveness.
- Hypothesis 2: Unlike the suggested hypothesis, the measured path coefficient between AI-DES and Project implies a weak relationship (-0.027), which is not statistically significant based on the T-statistic of 0.216 ($p = 0.829$). The data does not provide support for the assumption that AI-DES has positive effects on the Project.
- Hypothesis 3: The analysis offers empirical confirmation for the hypothesis, which is shown by the path coefficient of 0.234 between Ideation with AI and Lecture, which suggests a moderately positive association. Furthermore, this relationship reaches statistical significance, as demonstrated by the T-statistic of 1.844 ($p = 0.066$). Therefore, while the integration of AI in the process of ideation is projected to produce positive results in the setting of lectures. Yet, additional research is necessary to obtain more accurate results.

- Hypothesis 4: In contrast to the hypothesis, the data fails to offer verification for the hypothesis that Ideation with AI has a beneficial effect on the Project, similar to H2. The observed path coefficient between Ideation with AI and Project is very weak (0.146), however, it fails to reach statistical significance, according to T-statistic of 1.345 ($p = 0.179$).
- Hypothesis 5: The analysis shows support for the hypothesis, as the path coefficient between Lecture and Project exhibits a strong positive correlation of 0.778, which is statistically significant with a T-statistic of 9.459 ($p < 0.001$). The result suggests that lectures have a substantial effect on generating positive project outcomes within the field of technopreneurship education.
- Hypothesis 6: The hypothesis is supported by the results of the study, as seen by a strong positive relationship of 0.539 among Lecture and Learning Objectives, with a highly significant T-statistic of 4.037 ($p < 0.001$). The results obtained indicates the presentation of lectures plays a substantial role in assisting the achievement of learning outcomes within the frame of the technopreneurship course.
- Hypothesis 7: The correlation between Project and Learning Objectives suggests a moderate positive relationship, as demonstrated by a path coefficient of 0.246 and a T-statistic of 1.804 ($p = 0.072$). Although the final result is approaching statistical significance, it fails to meet the established criteria for significance ($p < 0.05$).

The statistical analysis finds that the data confirms five out of seven hypotheses. The deployment of AI-DES has a positive impact on Lecture (H1), and Lecture has a positive effect on both the Project (H5) and Learning Objectives (H6). However, the implementation of AI-DES does not have significant impacts on the Project (H2), and the impact of Ideation with AI on Lecture (H3) and Project (H4) results remains in doubt, requiring additional research. This study offers important insights into understanding the relationships between AI interventions, lectures, projects, and learning objectives within technopreneurship education. It points out the importance of successfully utilizing AI technologies and lectures as essential for achieving successful learning outcomes in this field of study.

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