Board 104: An Accelerator of Human Innovation Integrating Continuous Improvement and Lean Philosophy into Innovation Program for Undergraduate Students

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An Accelerator of Human Innovation: Integrating Continuous Improvement and Lean Philosophy into Innovation Program for Undergraduate Students

Abstract

This paper provides a novel program to create the seeds of innovation. Innovation is one of the most crucial elements of a successful startup, and it is important to move quickly. At the same time, many startups fail because they build the wrong product. The longevity of any business and/or industry relies on the effectiveness and rationale of the service providers. The paradigm and business methodology applied in lean six sigma is aimed at having the long-term effectiveness of the employees. Hence the lean and continuous improvement application has originally proved to be a quality process that provides and generates a high percentage of service output. Sustainable development has become a vital aspect of the success of any organization's programs since it ensures environmental, economic, and social sustainability during the program process; through this mechanism, Innovation as a learning system embeds design thinking, creativity, and sustainability. This system needs effectiveness in terms of the long-term relevance of service providers. After a deep review of thousands of recently published articles, journals, and other innovation programs to address the most common innovation program challenges, this study concludes that applying the lean philosophy and building continuous improvement culture will maximize program efficiency and eliminate waste; it is the ideal starting point to provoke more effective innovation. In general, Lean innovation is a methodology that helps you create products and services by offering the minimum product with measurable customer feedback at each stage of development. The process can be applied to any product or service and any sized organization, from small startups to large corporations.

In this setup, there are a lot of innovative programs for undergraduate students, but very few are effective and for the long term. Our program, ultimate innovation, exploits the mechanism of lean philosophy and continuous improvement culture to overcome those challenges. The ultimate innovation program was designed after addressing the most common educational challenges to provide a systematic, scientific pattern to help students and faculty members develop the thinking

skills required for continuous improvement as well as meet university goals. The program combines the speed of innovation with the rigor of customer development so you can iteratively build a product or service based on customer needs/wants. Additionally, the program consists of various processes hinged together to focus on individuals over processes to gain new creative insights and innovative solutions that could benefit students across the disciplines at the University. Also, the program takes advantage of the possible continuous feedback loop by releasing updates to customers more frequently. With the Ultimate Innovation program, participants will learn to lead by getting to know themselves better, harnessing their creativity, building teams and organizations through the culture of innovation., and reinforcing the skills needed to lead innovation. The Ultimate Innovation program will be considered an innovation role model for other universities and colleges to adopt our program.

Introduction

The activities involved in tasks have changed and transformed over time. The global society has experienced this transformation, with the aim of making work easier. This has resulted in the creation of numerous programs to improve human life. The innovation and subsequent programs entered human life through the human effort to advance and constantly improve the current state of affairs. The history of innovation can be traced back to the first human civilizations when advancements in agriculture, transportation, and communication led to the emergence of philosophies to improve how tasks were performed [1]. The 18th and 19th centuries saw the Industrial Revolution, which led to rapid progress in manufacturing and technology, resulting in profound social and economic transformations worldwide [2]. However, most of these advancements took place in the industrialized countries of today, which are renowned for their technical progress and advancements for a sustainable economy.

Godin [3] states that innovation programs and initiatives specifically encourage and support new ideas and technology creation. In this sense, innovation was never a one-time event but a continuous process throughout history. For instance, government-funded research and development programs were established during World War II to encourage the development of new technologies for military use. Many nations developed and implemented initiatives to promote

scientific advancement and economic progress in the post-war era. Hence, creating innovative programs was a fundamental strategy in response to a need.

Recently, many companies have begun introducing internal innovation programs worldwide to encourage their staff to generate fresh concepts and technologies that can benefit the business. This helps to increase the motivation to innovate. In such cases, businesses create programs that are applied globally, causing innovations to become popular. These programs provide a competitive edge in various industries and have led to the establishment of incubators, accelerators, and other initiatives to help start-ups and business owners create new goods and services [4].

After a deep review of published articles, journals, and existing innovation programs to identify the most common challenges faced in these programs, this study aims to create an innovative program tailored for undergraduate students. The primary goal is to answer the following question: How can integrating continuous improvement and Lean philosophy into an innovation program for undergraduate students to improve their creative problem-solving abilities, enhance their performance, and better prepare them for the job market?"

By examining the impact of the Ultimate Innovation program on undergraduate students' performance and skill development, this research seeks to demonstrate the benefits of incorporating lean philosophy and a continuous improvement culture into their learning experience. The Ultimate Innovation program was designed after conducting an extensive review of published articles, journals, and existing innovation programs to identify the most common challenges faced in these initiatives. By harnessing the mechanisms of lean philosophy and continuous improvement culture, the program aims to overcome prevalent challenges and provide a systematic and scientific approach to help students and faculty members develop the thinking skills required for continuous improvement. Ultimately, this program seeks to align with university objectives and better prepare students for success in the job market. Tables 1 and 2 show a summary of participant skills and learning outcomes after completing the program.

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Table 1: Participants' skills after completing the UI program.

Participant Skills	Description
Problem Solver	An innovative way of thinking, creative problem-solving skills, competency in design thinking, and recognizing when possibly irrelevant, preexisting patterns affect our thinking process
Lean leadership	Evaluate and improve the innovative idea, using imagination to generate ideas, concepts, or ways of working that are both original and valuable to develop an innovation project.
Scientific Researcher	Planning, analyzing, conducting experiments, and identifying the information and facts needed to draw a conclusion
Engagements	This leads to optimal productivity, outstanding performance, and creativity.
Sustainability	Create seeds of student sustainability to lead with an outstanding performance.

Table 2: Program Learning Outcomes

Program Learning Outcomes (PLOs)	Description
(1)	Ability to identify and formulate problems worth solving to deliver creative, sustainable, and nonobvious solutions.
(2)	Ability to apply effective design thinking and lean philosophy to draw logical conclusions in evaluating complex problems.
(3)	Ability to apply systematic research to plan, conduct appropriate experimentation, analyze, and interoperate data, and provide innovative insights.
(4)	Ability to communicate effectively with all types of audiences the desired messages and emotions through word choice, tone, and gestures.
(5)	Ability to function and strive effectively on a team with diverse skills and experiences, create a creative collaborative, and inclusive environment, establish goals, plan tasks, and meet objectives.
(6)	Ability to acquire and apply new knowledge, methods, tools, and way of thinking to generate innovative ideas effectively in diverse contexts.

Literature Review

To build an innovative and effective program, we follow the following framework, as shown in figure 1:

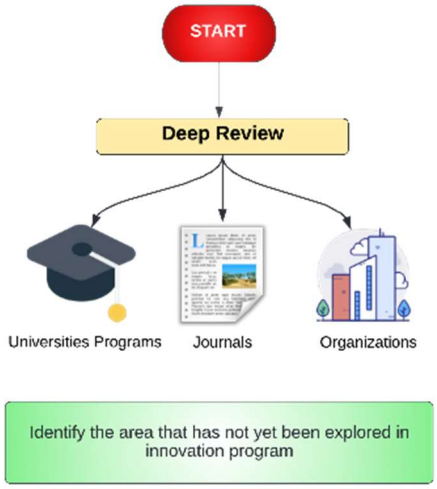

Figure 1: Review Framework

Schilling [5] states that innovation programs aimed at economic growth have a strong relationship with activities promoting economic growth. The core practices of these institutions emphasize leadership and management programs that support global innovation programs. Although many initiatives exist to encourage creativity and entrepreneurship among undergraduate students, not all of them may be successful or long-lasting. The goal of sustainable innovation programs is to ensure their long-term viability. Research group [4] note that many programs are not designed to meet the unique needs and interests of the students they serve, which is a major factor in their success. For instance, students interested in social entrepreneurship, or the arts may not be suitable candidates for a curriculum focused on technological innovation. Undergraduate innovation programs should create programs that cater to the student's individual needs. In addition, Some innovation programs require more resources and support to help students turn their ideas into viable enterprises or businesses, which is another reason why many undergraduate programs need to be more effective and sustainable [1]. For example, a program might provide financial support for student projects but without mentoring, business development assistance, or networking opportunities. It may be challenging for undergraduate students in some programs to continue developing and building their ideas once the program is done. Hence, it requires committed

leadership initiatives that continuously strive for progress, and there may need to be a clear path for students to take their ideas or projects outside the program.

The "Innovation Challenge" program, where undergraduate students from various universities compete to present their ideas in front of a panel of judges, is an example of an ineffective long-term program; this program is only a one-time event, with no follow-ups, mentorship, or support services to help the students turn their ideas into reality. Another example is the "Summer Incubation Program." This program lasts eight weeks, and enrollment students are not provided with the necessary tools and support to continue developing their ideas after the program ends. According to [5]., effective and sustainable undergraduate innovation programs should be tailored to meet students' specific needs and interests, provide adequate resources and support, and have a clear path for students to continue pursuing their ideas.

Despite the numerous initiatives that encourage innovation and entrepreneurship among undergraduate students. Most of those programs may fail or have limited impact due to a lack of relevance, funding, support, clear pathways for students, short-term focus, or insufficient follow-up. Different studies [3], [5]. highlight the key role of successful innovation programs. They believe all Undergraduate innovation programs should be tailored to meet student's specific needs and interests, provide adequate resources and support, have a clear pathway for students to continue developing their ideas after the program, and have a mechanism for monitoring student progress and providing additional support as needed.

Table 3 shows a summary of the key findings from some of the reviewed articles, those articles from different times to understand the revolution of innovation programs and provide important insights for universities and organizations that are looking to create and implement effective and sustainable Innovation programs.

Table 3: Summary of the key findings from some of the reviewed articles

Author	***Year***	***Title***	***Innovation element***	***Findings***
[6]	*2023*	*The impact of risk-taking and creativity stimuli in education toward innovation*	*Thinking Skills and Creativity*	*Social innovation, design education, and thinking are the dominant multidisciplinary approaches and central vehicles for creativity and innovation diffusion.*
[7]	*2021*	*The impact of entrepreneurship education on the entrepreneurial mindset of college students in China: The mediating role of inspiration and the role of educational attributes*	*Lean Innovation*	*Undergraduate innovation programs positively impact students' entrepreneurial mindset and skills.*
[8]	*2021*	*Explaining standardized educational test scores: The role of creativity above and beyond GPA and personality*	*Creativity*	*Identify the thinking abilities that play a crucial role in traditional academic outcomes (Convergent and Divergent).*
[9]	*2020*	*Engineering Students' Innovation Competence: A Comparative Analysis of Nigeria and South Africa*	*Creativity, leadership, self-efficacy, energy, and risk propensity.*	*University culture, resources, activities, emotional support, training programs, and partnership are crucial for students.*
[5]	*2019*	*Strategic management of technological innovation*	*Leadership and management*	*The core practices have taken pride in the institutions by including global leadership and management programs that support innovative programs.*
[10]	*2019*	*University-industry collaboration: A literature review and synthesis*	*Collaborative innovation*	*Collaboration between universities and industry partners can lead to more effective innovation programs.*
[11]	*2018*	*Multi-disciplinarity breeds diversity: the influence of innovation project characteristics on diversity creation in nanotechnology.*	*Program Environment*	*Multidisciplinary innovation programs can have a greater impact than programs focused on a single discipline.*
[4]	*2016*	*The role of university incubators in stimulating academic entrepreneurship*	*Lean start-up*	*Students who are more interested in social entrepreneurship or the arts may not be appropriate candidates for a curriculum emphasizing technological innovation in lean startups.*

[12]	*2015*	*A note on outbound open innovation and firm performance*	*Innovation Environment*	*Active student involvement is crucial for the success of university innovation programs.*
[3]	*2012*	*Innovation contested: The idea of innovation over the centuries*	*Design thinking*	*Innovation programs and initiatives specifically are encouraged and supported through the creation of new ideas and technology, thus prompting design thinking that resonates with innovation ideologies.*
[13]	*2007*	*University entrepreneurship: a taxonomy of the literature*	*Program environment and continuous improvement*	*The integration of theory and practice is important for the success of university innovation programs.*
[1]	*1983*	*Industrial innovation policy: Lessons from American history*	*Innovation and continuous improvement*	*Some innovation programs need more assistance and resources to enable students to transform their ideas into workable enterprises or businesses, another important factor contributing to the great majority of undergraduate programs needing to be more effective and sustainable, thus enhancing innovation and continuous improvement.*

Methodology

A unique and evaluation methodology has been used to ensure meeting the research objective. This methodology consists of six steps “RDMAIC”, as illustrated in figure 2:

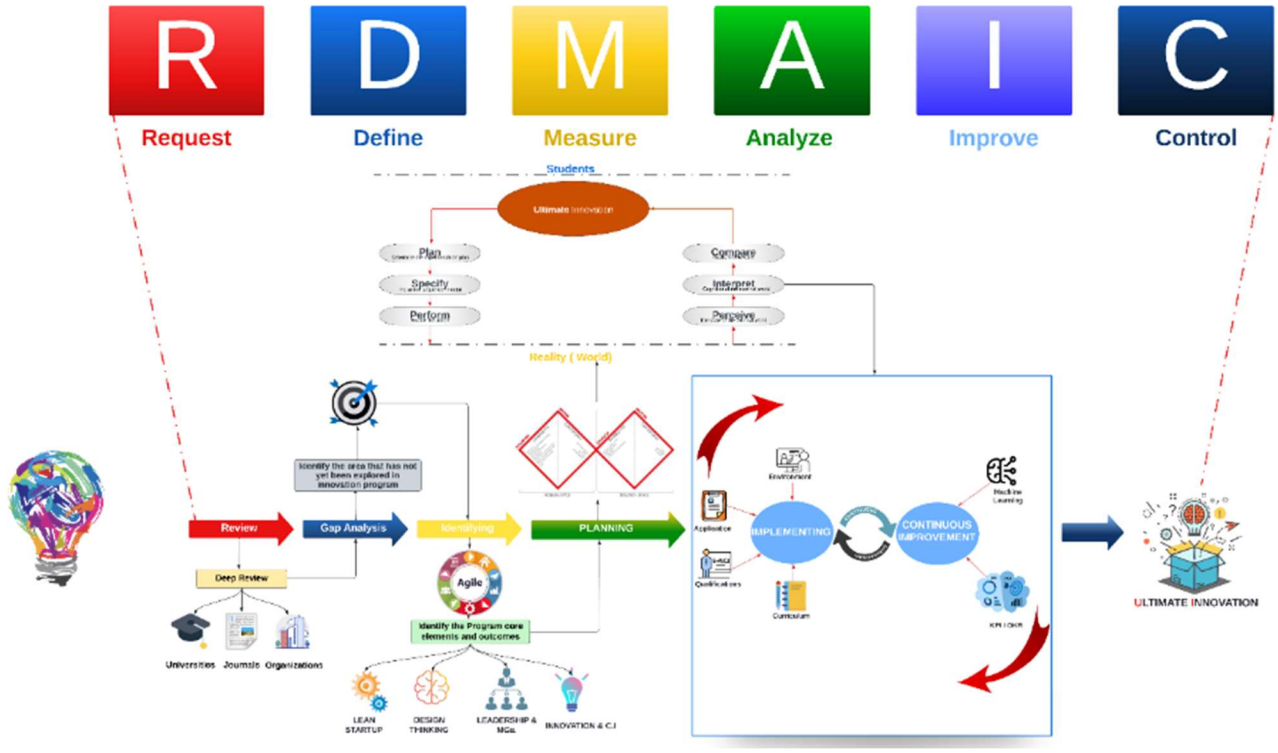

Figure 2: Research Methodology

Overview

The research methodology, RDMAIC (Request, Define, Measure, Analyze, Improve, Control) is a six-step "six sigma problem-solving approach" that has been employed in this project. This approach is widely applied when there is a variation in specifications or expectations in a process or a product. In this study's case, there is a variation in undergraduate programs where innovation is required to meet current higher education demands. RDMAIC addresses enhancements in productivity, quality, finances, and time. The RDMAIC method can be described as a process improvement process and the steps are expounded as below.

Request

The first step in our methodology is referred to as the "Request "step. This step involves a request being made to initiate an effective innovation program. the University of Tabuk's president was concerned about the innovation programs in the university and asked the College of Engineering to study and analyze the current situation and to develop an innovative program based on science and successful experiences in undergraduate studies. The request was made due to the

inadequacies of the current program, which was not meeting current learning or student development standards. The goal was to enhance learning and meet the emerging demands for innovation.

Define

This step involves defining the problem and scope of the work effort required by the team. A deep review of other university innovation programs, published journals and articles and leading organization in innovation was conducted, to identify the area that has not been explored in innovation programs and provide a clear understanding of what needs to be done as shown in figure 3:

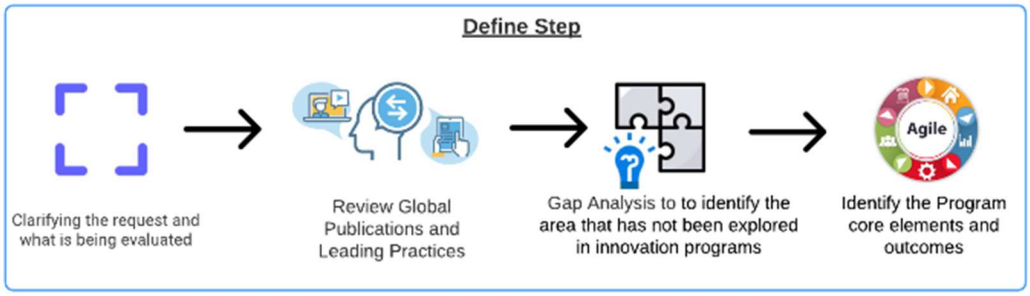

Figure 3: Define step framework.

The defined framework led us to introduce the ultimate innovation program “UI”. The UI program was designed to overcome the most common educational challenges and provide a systematic and scientific approach to help students and faculty members to lead in innovation and develop the critical thinking skills required for continuous improvement. This program combines the speed of innovation with the rigor of customer development, allowing students to iteratively build a product or service based on customer needs or wants. Moreover, it consists of a variety of processes that focus on individuals over processes, helping them to gain new creative insights and innovative solutions that can benefit students across different disciplines at the University. The program's core elements were inspired by the DNA mechanism, all the elements are hinged together and affect each other. Thus, any innovation program that universities come up with must have these core elements as the main pillar. The program core elements are shown in figure 4:

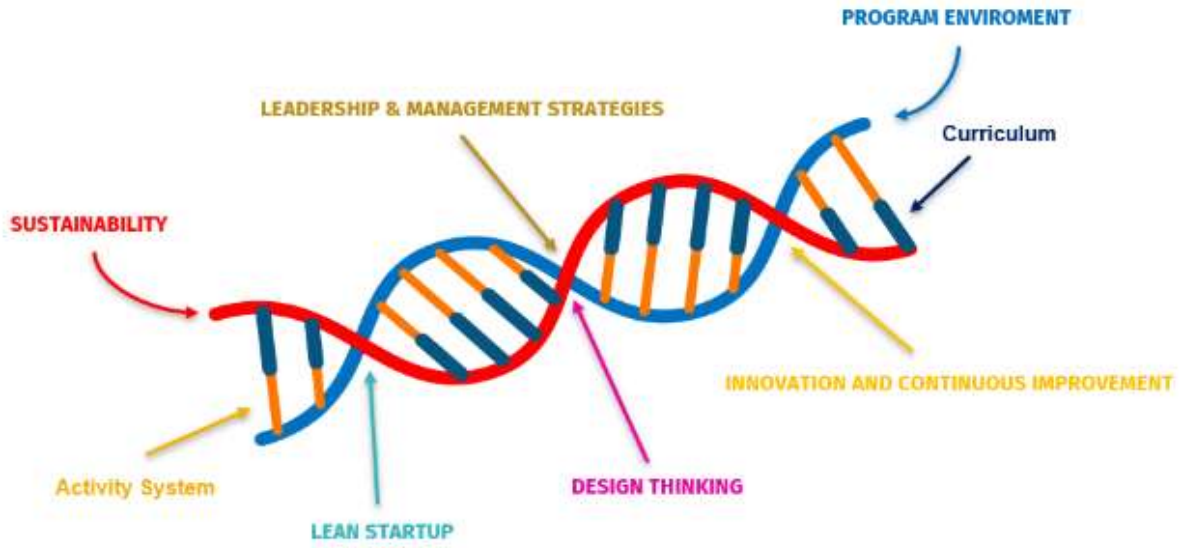

Figure 4: UI Program core elements inspired by the DNA mechanism.

The ultimate innovation core elements are described below:

- Program environment: This refers to the physical, social, and cultural context in which the innovation program operates and is supported by the necessary infrastructure and resources.
- Curriculum: This includes the courses, modules, and resources used to teach and educate individuals. A specialized curriculum has been designed for the ultimate innovation program, consisting of 6 courses over one academic year.
- Innovation and continuous improvement: This is an ongoing process that allows organizations to continuously grow and improve. In the ultimate innovation program, different AI models are used to nominate students and faculty members for enrollment and teaching.
- Leadership and management strategies: Teaching UI students the most successful strategies and techniques used by leaders and managers to guide and motivate their employees towards achieving their goals and objectives.
- Design thinking: This element provides a creative way of thinking and problem-solving skills, as well as the ability to recognize when preexisting patterns may affect our thinking

process. It focuses on understanding users' needs, exploring and testing possible solutions, that leading to the best option to solve the problem.

- Lean startup: UI students will have the ability to evaluate and improve innovative ideas, using imagination to generate ideas, concepts, or ways of working that are both original and valuable to develop an innovation project**.** The goal of this element is to validate a product idea as quickly as possible and to eliminate waste by making small, incremental improvements.
- Activity system: This element is considered as the backbone of the program, it's a set of activities and processes that are necessary for a program to function. which have been specially designed for the ultimate innovation program to achieve optimal productivity, performance, and enhance creativity.

Measure

This step plays a crucial role in our methodology. Starting with entails measuring the current performance of students based on the innovative programs being applied. Through this, a double diamond approach is being used as shown in figure 2. Also identifies any available data on innovation programs and develop a plan to gather information on sustainability, leadership and management strategies, curriculum, program environment that this innovation can thrive, how continuous improvement can be done, design thinking among others. So, to assess student performance in the Ultimate Innovation program. At the beginning of the program, students participated in an orientation exam. This exam consisted of an interview and a written test. This exam aimed to assess students' current knowledge and skills related to the program, providing a baseline for monitoring their progress throughout the course. After the orientation exam we employed a multi-faceted assessment strategy as shown in figure 5. This strategy includes various evaluation tools, and these tools were designed to capture different dimensions of student learning and engagement, ensuring a comprehensive understanding of their progress throughout the program.

- Weekly quizzes: These quizzes were used to gauge students' understanding of the courses content and allowed instructors to track their progress regularly.
- In-class participation: Students were encouraged to engage in group activities, such as problem-solving tasks and case studies, and then present their solutions as elevator speeches at the end of the class. This approach facilitated the development of collaborative skills, critical thinking, and effective communication.
- Weekly homework assignments: Utilizing the university's online platform, students were given weekly homework assignments that required them to critically analyze innovative ideas, videos, and solutions to global problems. This approach fostered their ability to critique and evaluate various concepts from different perspectives.
- Bi-weekly live meetings with successful entrepreneurs: Every two weeks, students participated in a one-hour live meeting with a successful entrepreneur who shared their story and experiences. After each meeting, students were given 24 hours to submit a one-page response and feedback paper reflecting on the insights and lessons learned from the entrepreneur's journey.
- Final program project: The enrollment students were from different departments, we put them into 5 interdisciplinary groups, each group had 4 students. They collaborated on a term project to be submitted at the end of the program, promoting an innovative environment within these small groups. Their progress in the project was evaluated every 2 weeks, fostering collaboration between students with diverse backgrounds, such as medical and engineering students.

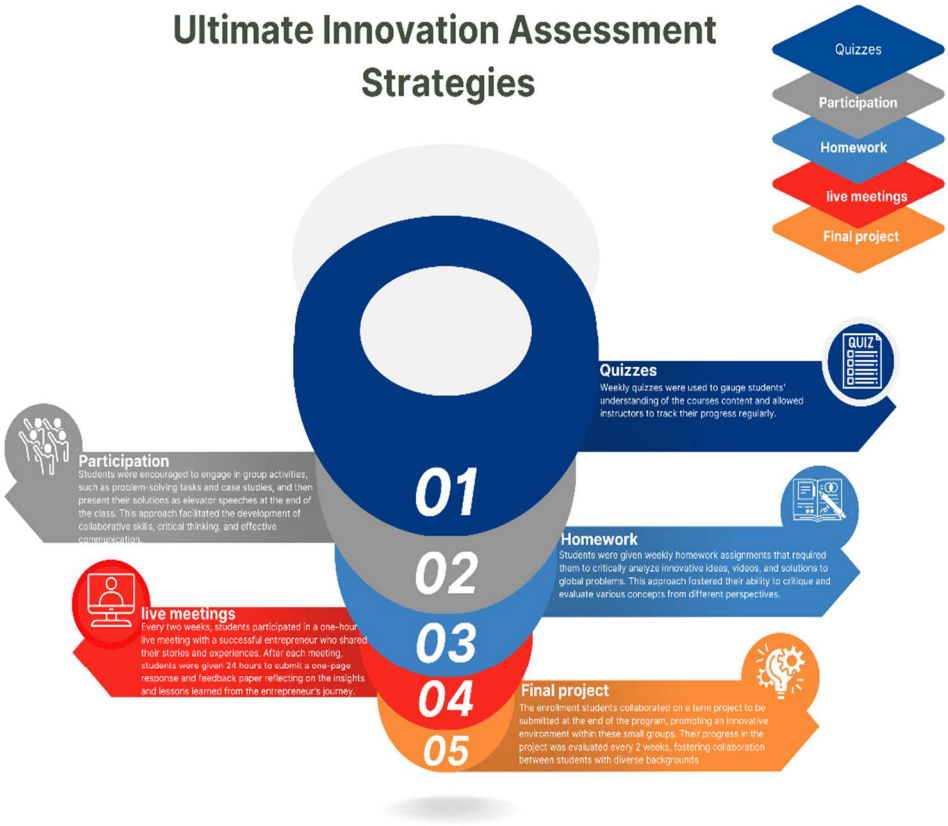

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Figure 5: UI Program evaluation strategy.

The core elements of the Ultimate Innovation Program are Design Thinking, Lean Startup, Leadership & Management Strategies, and Innovation & Continuous Improvement. To create an effective design that represents and supports these core elements, each element features a distinct rubric based on the activity system dedicated to that specific component. Figure 6 shows a sample of the students' performance (data collected) per week.

	Week														
Student 1	Orientation	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Quiz DT /ACT	0	45	57	60	70	80	65	75	81	78	72	71	81	82	84
DT Participates	0	73	79	74	60	67	85	85	76	82	78	82	84	86	87
Design Thinking	68	65	72	70	63	71	79	82	78	81	76	79	83	85	86
LS Participates	0	70	72	78	74	81	78	84	80	79	77	88	85	85	85
LS Activity Feedback	0	67	65	80	72	75	68	85	81	87	88	90	88	88	91
Lean Startup	54	68.8	69.2	78.8	73.2	78.6	74	84.4	80.4	82.2	81.4	88.8	86.2	86.2	87
Teamwork	0	0	0	0	0	0	0	0	0	0	0	85	87	87	85
Leadership and Management Strategies	77	55	45	80	70	55	65	60	60	81	60	85	87	87	85
Project Participates INN&CI	0	0	0	0	0	0	0	0	0	0	0	75	87	90	85
Innovation and Continuous Improvement	60	88	70	75	84	66	86	68	45	70	55	75	87	90	85
Student 2	Orientation	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Quiz DT /ACT	0	67	70	68	70	80	70	75	87	85	80	89	81	86	88
DT Participates	0	68	79	74	80	80	80	85	84	89	84	82	90	92	90
Design Thinking	71	68	76	72	77	80	77	82	85	88	83	84	87	90	89
LS Participates	0	65	68	80	78	81	78	84	84	84	88	92	90	90	91
LS Activity Feedback	0	67	65	80	77	84	72	90	81	82	85	94	91	89	91
Lean Startup	62	65.8	66.8	80	77.6	82.2	75.6	86.4	82.8	83.2	86.8	92.8	90.4	89.6	91
Teamwork	0	0	0	0	0	0	0	0	0	0	0	82	84	81	87
Leadership and Management Strategies	60	58	48	60	58	72	68	69	70	74	72	82	84	81	87
Project Participates INN&CI	0	0	0	0	0	0	0	0	0	0	0	89	90	92	91
Innovation and Continuous Improvement	75	86	82	80	87	90	88	79	84	86	88	89	90	92	91
Student 3	Orientation	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Quiz DT /ACT	0	44	54	58	64	69	65	70	74	78	76	75	81	78	82
DT Participates	0	79	79	73	69	67	76	77	78	82	78	82	86	81	86
Design Thinking	64	69	72	69	68	68	73	75	77	81	77	80	85	80	85
LS Participates	0	65	68	72	74	77	71	80	80	82	86	88	83	84	82
LS Activity Feedback	0	60	65	75	78	75	78	78	85	87	88	90	90	88	91
Lean Startup	52	63	66.8	73.2	75.6	76.2	73.8	79.2	82	84	86.8	88.8	85.8	85.6	86

Figure 6: Sample of the student performance per week.

Analyze

The data collected from the "measure" step will be analyzed to identify the gap between the current performance and the desired performance. This step is vital as it sets the foundation for the improvement process and helps UI directors to make informed decisions. The information gathered will be used to establish a baseline and create a benchmark for future evaluations. Additionally, the faculty member journey involves using a different AI model to select the best-suited faculty members to teach in the ultimate innovation program. The faculty selection process is based on different indicators such as the qualifications, experience, and skills of each faculty member. After the selection process, a training program is provided for the selected faculty members to enhance their skills and knowledge in innovative teaching and mentoring. Figure 7 shows an overview of the faculty member's journey.

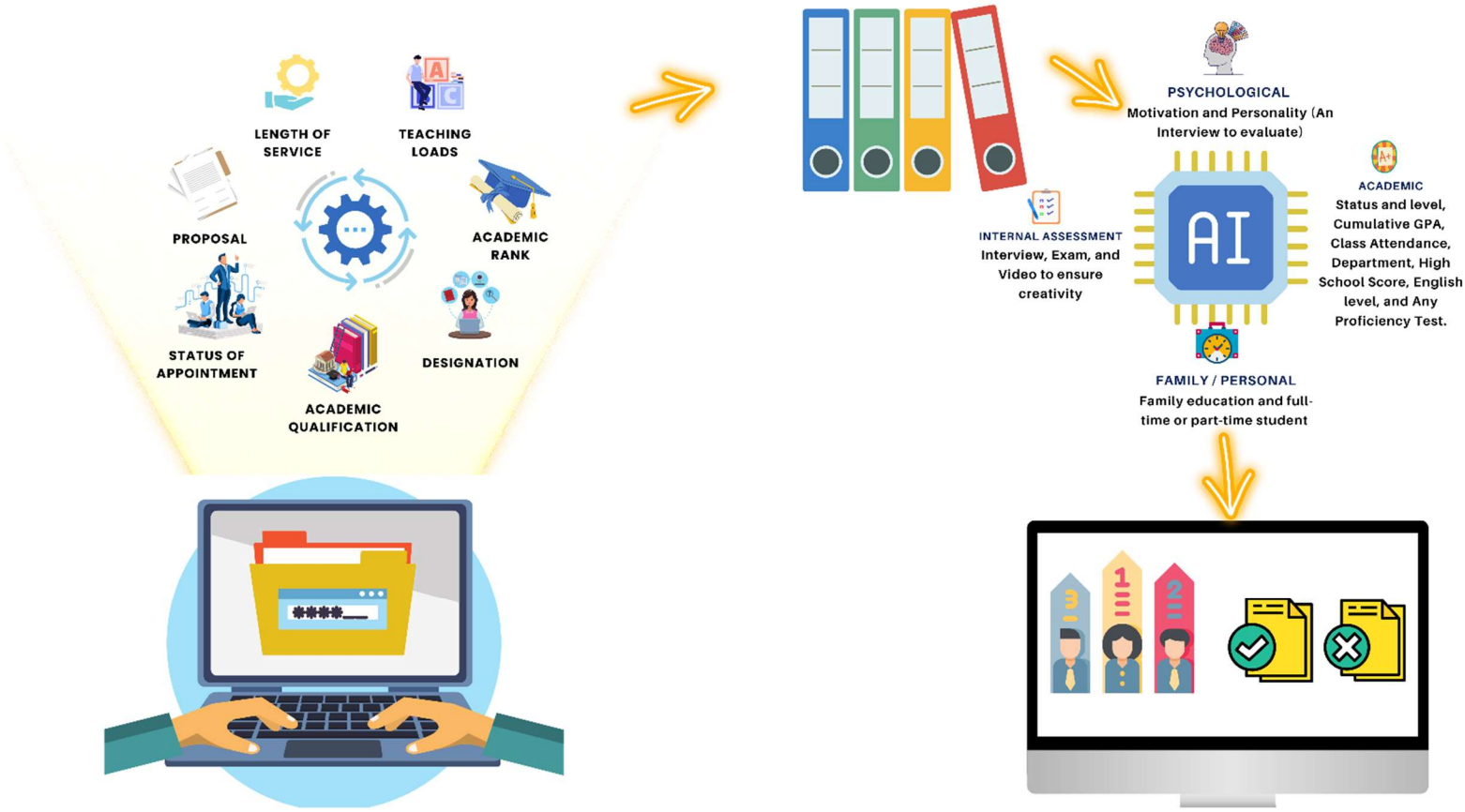

Figure 7: Overview of UI Program smart system.

By using AI models to select students and faculty members, the program ensures that only the most qualified individuals are selected, resulting in the best outcomes for the program and the individuals involved. Moreover, nominated student/faculty members can accept or reject joining the program. Also, students' journeys are different from faculty members' journeys, their journey consists of two different models. From 30000 students only 78 students were qualified after model 1 then an orientation was required for all the nominated students to proceed to model 2, at the end only 20 students were qualified for the ultimate innovation programs students' journey are shown in figure 8:

Figure 8: Students Journey from nomination to enrollment (orientation exam).

Improve

Once the program has been launched a continuously tracking system has been implemented for improvement purposes. The program will be evaluated and improved based on different assessments and feedback from students, faculty members, and University stakeholders. The goal is to ensure that the program is meeting its intended outcomes and that students are developing the necessary skills for success in their future careers.

Control

The program will be monitored using various metrics and data sources, such as student performance data, program attendance and participation, and evaluations from students and faculty. Based on this step, adjustments will be made to the program to ensure it remains relevant and effective in meeting the needs of students and the university. Additionally, the AI models used

for student and faculty selection will be reviewed and improved to ensure that they are accurately identifying the most qualified and motivated individuals for the program. Ultimately, the control step helps to ensure that the ultimate innovation program is a sustainable and valuable asset to the university and its students. Figure 9 shows an overview of the ultimate innovation program.

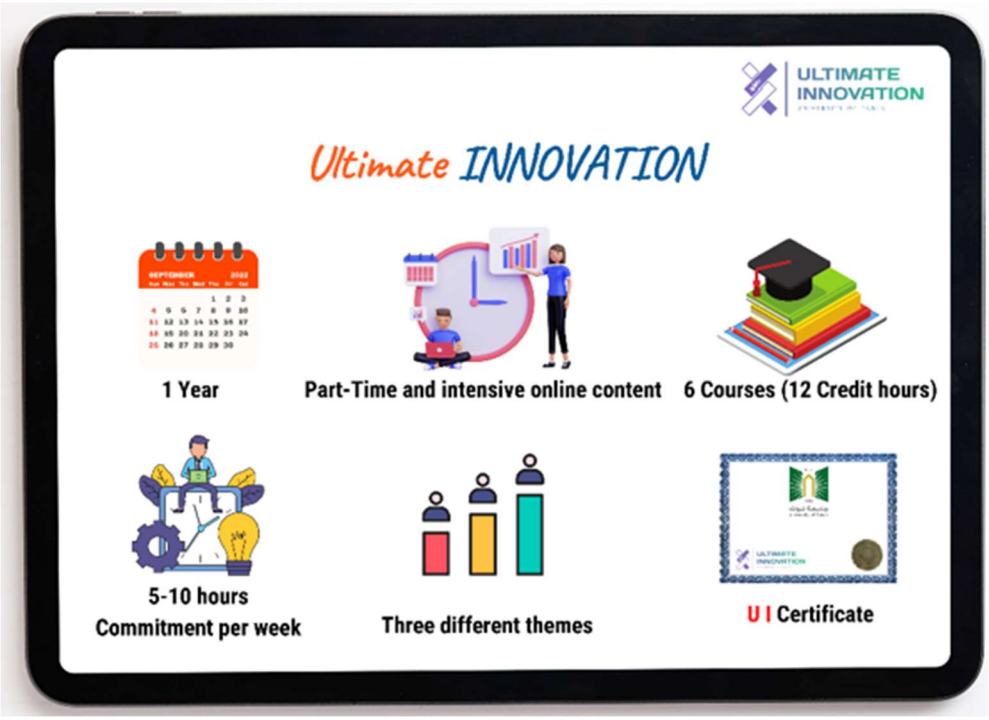

Figure 9: Overview of the ultimate innovation program

Results and Analysis

Innovation in undergraduate studies is very essential as it allows students to be equipped with creativity and job market skills straight from university. Thus, it is imperative for lecturers to ensure that students remain relevant by initiating innovative programs. The enrolment students were 20 students from various departments at the University of Tabuk, each student has his own performance profile (Report) to represent his performance, skills gained during the program and prediction for his future performance based on his current performance as shown in figure 6. The Ultimate Innovation assessment strategies, as depicted in figure 5, were followed to evaluate the students' performance. Table 4 provides a list of the students' departments.

Table 4: 2022 Enrollment students department

Number of Students	Department
2	Arts
2	Business
3	Medicine
4	Science
4	Engineering
5	Applied Medical Science

Figure 10 shows the average results of the students' performance at the orientation, the end of the first semester, and the expected performance at the end of the program. The results indicate that the ultimate innovation program has had a significant impact on the students' performance and thinking skills. The students' scores in the final assessment were higher compared to the scores in both the orientation and first semester. This indicates that the students have improved their thinking skills and have become more creative and innovative in their problem-solving abilities. The results also show that the ultimate innovation program has met its goals and objectives as the students have become more equipped with the skills required to succeed in the job market.

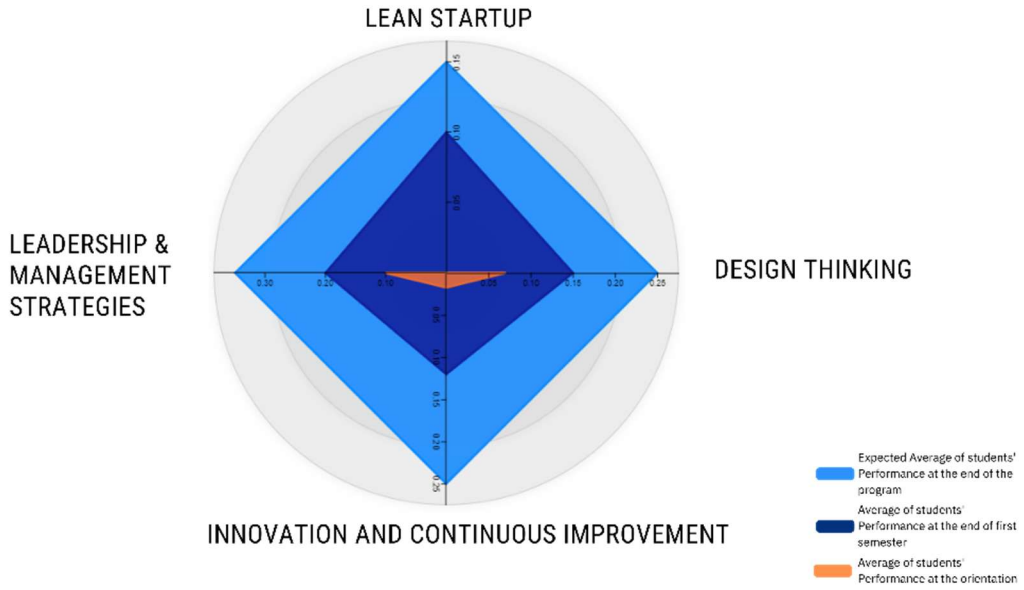

Figure 10: Overview of students' average performance at *different stages*

Conclusion

In conclusion, the Ultimate Innovation Program has successfully addressed the research question: How can integrating continuous improvement and Lean philosophy into an innovation program for undergraduate students lead to improved creative problem-solving abilities, enhanced performance, and better preparation for the job market?

The program has received positive feedback from both students and faculty members, indicating its effectiveness in achieving these goals. Students reported increased confidence in their problem-solving abilities, gained valuable skills and knowledge applicable to their future careers. Moreover, faculty members observed improvements in student performance, acknowledged that the program provided students with the necessary tools and resources to continue their innovation journey. Furthermore, as part of the program, each group submitted a research paper for journal publication, allowing them to contribute to the broader academic community and gain valuable experience in disseminating their findings.

The significant positive impact of the Ultimate Innovation Program on students' performance and thinking skills suggests that implementing it in other universities and using it as a model for future innovation programs in undergraduate studies is highly recommended. Further research can explore the implementation of the program in various companies and non-educational organizations to highlight the potential impact of the program across different settings.

In summary, the findings of this study have clearly answered the research question, demonstrating the value of integrating continuous improvement and Lean philosophy into an innovation program tailored for undergraduate students. This innovative approach not only enhances their performance and creative problem-solving abilities but also better prepares them for the job market and allows them to actively participate in the academic community through research paper submissions.

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