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# International Teaching Aid Competition 2023

Reconnoitering Innovative Ideas in Postnormal Times

# iTAC

# 2023

**iTAC 2023**  
**INTERNATIONAL TEACHING AID COMPETITION**  
**E-PROCEEDINGS**

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## **PREFACE**

iTAC or International Teaching Aid Competition 2023 was a venue for academicians, researchers, industries, junior and young inventors to showcase their innovative ideas not only in the teaching and learning sphere but also in other numerous disciplines of study. This competition was organised by the Special Interest Group, Public Interest Centre of Excellence (SIG PICE) UiTM Kedah Branch, Malaysia. Its main aim was to promote the production of innovative ideas among academicians, students and also the public at large.

In accordance with the theme "Reconnoitering Innovative Ideas in Post-normal Times", the development of novel ideas from the perspectives of interdisciplinary innovations is more compelling today, especially in the post-covid 19 times. Post-pandemic initiatives are the most relevant in the current world to adapt to new ways of doing things and all these surely require networking and collaboration. Rising to the occasion, iTAC 2023 has managed to attract more than 267 participations for all categories. The staggering number of submissions has proven the relevance of this competition to the academic world and beyond in urging the culture of innovating ideas.

iTAC 2023 committee would like to thank all creative participants for showcasing their innovative ideas with us. As expected in any competition, there will be those who win and those who lose. Congratulations to all the award recipients (Diamond, Gold, Silver and Bronze) for their winning entries. Those who did not make the cut this year can always improve and join us again later.

It is hoped that iTAC 2023 has been a worthy platform for all participating innovators who have shown ingenious efforts in their products and ideas. This compilation of extended abstracts published as iTAC 2023 E-Proceedings contains insights into what current researchers, both experienced and novice, find important and relevant in the post-normal times.

Best regards,

**iTAC 2023 Committee**  
**Special Interest Group, Public Interest Centre of Excellence (SIG PICE)**  
**UiTM Kedah Branch**  
**Malaysia**

## THE PEDAGOGY APPROACH FOR ENHANCING CREATIVITY AND INNOVATION IN THE PRODUCT DESIGN PROCESS: A CASE STUDY APPROACH

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### ABSTRACT

The case study focused on the pedagogical approach to enhancing creativity and innovation among the science and technology students of the UiTM Pulau Pinang Branch. The sample for this study consisted of 46 degree-seeking students from the Faculty of Mechanical Engineering. The entrepreneurship course - ENT600 requires them to innovate technology-based products and services. The case study collected data in the product design process during the teaching and learning process. The process of generating ideas was based on the product design process. The phases of product and service design were recorded and justified with the achievement of awards gained by participating in the invention and innovation competition. The findings revealed that the intervention strategies contribute to the successful creation and innovation of product and service ideas. The pedagogical approach based on the facilitator's or lecturer's intervention enhanced students' innovativeness and creativity. It has been revealed that the intervention phase has activated and motivated students' product or service idea generation. During the intervention process, students showed high participation in justifying their ideas, increasing creative thinking and problem-based learning. This project-based learning contributes to the innovative and creative teaching method by starting with addressing the problems or issues in the beginning, finding solutions, and entering a new phase of intervening, justifying, approving, and testifying, sketching, and evaluating ideas. The instructional strategies of probing questions for justifications have created a high participation rate in classroom discussions, enhancing creative thinking and problem solving where students are engaged in the learning process to support and justify ideas.

**Keywords:** pedagogy approach, creative ideas, innovative learning, intervention, product design, learning tools

## INTRODUCTION

It is essential to produce creative education in light of the market's rapid change in order to improve student learning and foster innovation from an educational standpoint. The development of powerful teaching techniques could improve students' comprehension of the lesson's material. According to the course learning results, the innovative learning procedures have an impact on the ideal learner attributes. Therefore, planning for educational innovation in the classroom is necessary to guarantee that the learning objectives are met (Seechaliao, T., 2017).

The common characteristics that are practically embedded in instructional strategies have been identified in a study Seechaliao, T. (2017) conducted on advice in building instructional strategies to realise creative and innovative education in the classroom. Results indicated that by posing some challenging questions during class discussions, encouraging independent study, encouraging inductive and deductive reasoning, or using media, lecturers might raise students' interest in the learning activities and foster their creativity. The research's emphasis on intervention approaches to foster students' creativity and innovation during the learning process is supported this case study findings. The following are a few of the efficient methods employed in the educational methodologies mentioned;

- 1) Project-based learning, teamwork, discussion, brainstorming, or anything else that can elicit critical ideas that necessitate feedback from the speakers
- 2) The use of the outside-the-box method to generate novel, creative concepts
- 3) Post difficult queries to spark original thought
- 4) For the learners, the most effective reinforcement tactics include rewarding their ideas, mentoring and coaching them, and giving them feedback or reactions.
- 5) Align instructional methods with the competition's activities
- 6) The use of lecturing while demonstrating, having group discussions, simulating situations, teaching by inference and deduction, etc.
- 7) Increase students' motivation through teaching by implementing the ARCS Model theory and concentrating on students' attention, relevance, confidence, and satisfaction.
- 8) Giving clear directions for accomplishing learning objectives that are suitable with students' abilities and characteristics, learning styles, course content, and activities, as well as the mission and vision of the institution, learning settings, and the facilities made available for using technology

In general, lecturers or educators would improve the teaching and learning process to guarantee a high level of learning transfer. Regarding the development of learners' creativity and originality, this typically calls for high-order cognitive abilities related to problem-solving, decision-making, finding original solutions, analytical and critical thinking, and turning creative ideas into workable solutions.

## **DESIGN THINKING**

In today's technologically advanced and fiercely competitive world, graduates must possess a wide range of abilities. Design thinking is regarded as one of the key competencies for the engineering sector. The majority of engineering programmes are founded on fundamental science and apply scientific ideas to solve technology difficulties. This practise makes it more difficult for graduates to use their knowledge and talents in the workplace. This problem has forced curriculum developers, particularly those in charge of engineering faculties and colleges, to realise the complexity of the subject matter and the resources needed to teach it (Shute & Becker, 2010; Todd & Magleby, 2004).

In corporate environments, design thinking is given the utmost importance when developing new goods or services. The process is seen as the key element of a company's ability to compete (Dunne & Martin, 2006). Due to its emphasis on problem-solving and creative thinking, design thinking has emerged as a crucial concept in the domains of design, engineering, and business. In order to solve complicated problems, engineering students must be able to think critically and rationally (Rotherham & Willingham, 2009). To help students improve their problem-solving abilities and get ready for future careers in the industry, lecturers and educators need to help and support them as they develop 21st-century skills (such as design thinking, systems thinking, and teamwork skills) (Shute & Torres, 2012).

Design, according to Braha and Reich (2003), is a process of change to eliminate discrepancies and create a fit between the issue stages. According to Suwa, Gero, and Purcell (2000), designing is a condition in which the designers respond to environmental changes. Unexpected discoveries and inventive requirements are correlated in both directions. The relevance of alternation during the design process activities, such as sketching and coming up with dynamic designs to further explore evolution and solution possibilities, is emphasized by these two components.

## **ENT 600 TEACHING AND LEARNING PERSPECTIVES**

The effective of teaching and learning strategy is highlighted in this case study. This pedagogy approach has a big impact on the ways that university teach product design in order to boost students' originality and creativity. It applies the design thinking process' ideas to the teaching

and learning of the ENT 600 topic while making methodological discoveries and insights about product creation and design. The results are based on a case study methodology with individual involvement in the form of interventions during the product/service design stages.

The ENT600 (Technology Entrepreneurship) is the university requirement subject and it is a compulsory subject for the bachelor degree students of all faculties. In this view, degree students are given the task of integrating technology applications as they investigate, inquire as to why, and seek solutions. It provides a resolution to the actual issues that arise during the designing process. Students are asked why and instructed to use design to solve their challenges. To design and innovate, whether by offering new ways of doing things or improving, changing, and modifying things for the better, it takes both cognitive and technical skill. It also requires an understanding of what is feasible and applicable as well as what is not. The design process takes into account costs, material needs and availability, processing steps, and final product or service attributes in comparison to those of the market's competitors' products or services.

Students learn about entrepreneurship in this course and develop their entrepreneurial abilities in the creation of technology-based goods and services. It encourages the knowledge of technology-based entrepreneurship that blends academic and practical viewpoints. Students must complete practical project-based projects for the course that involve creating advanced technological products and services (such as software apps). The instructional techniques include lectures, case studies, group projects, and presentations.

Students can CLO1 Examine the fundamentals of technology-based entrepreneurship after taking this course.

Apply your newly gained managerial and entrepreneurial abilities to seize business possibilities.

CLO3 Create the new product development group report and the technological venture blueprint.

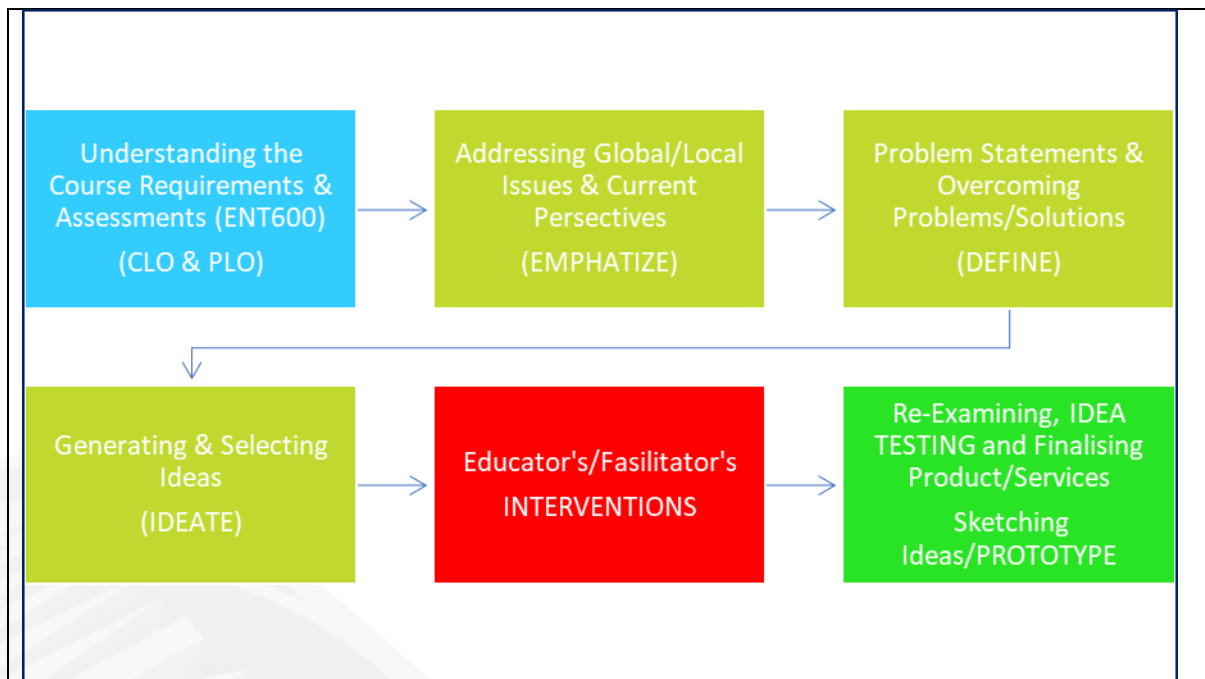
(<https://aims.uitm.edu.my/index.cfm/page/module/moduleId/152789>)

The management of the product designing process is the course's main task. It entails both the planning stage and learning by addressing and investigating concerns in the designing roots based on observations and practices from daily life. It improves students' ability to think critically and values the impact on their comprehension of how to address problems in designing for problem-solving, improving, altering, and changing through questioning in an effort to design solutions. This group project promotes learning via design and begins with an investigation of the obstacles and settings faced by the students on a daily basis. It is being developed as a way of learning that relies on hints and cues and has the capacity to comprehend



and mediate a variety of knowledge interests. As a tool for learning, product/service design could be purposeful, bring approaches, or produce ideas in a thorough and critical manner. Students benefit from having a deeper understanding of the learning process and moving towards more technologically driven product/service design. Students are observed and directed to follow specific steps in their study of the product/service in relation to the circumstances that constitute the setting of the statement or idea during the design process. These are in particular related to the ENT600 subject's course evaluations and rubrics.

They are free to select the innovation tools or approaches once they have decided on the ideal good or service for a contextual inquiry. To differentiate their offering from that of the competition in the market, companies must either create an entirely new product or service or modify and improve an existing one with a difference in relation to it of at least 30%. Before students could finish their innovations, there were interventions in the form of feedback and helpful remarks that they needed to take into account. To share ideas and solutions, the entire group must participate. In order to obtain the pertinent data required for the initial marketing research and to successfully address the justifications for specific issues.



**Figure 1.** ENT600 Product Design Process

The stages include;

The first phase;

Understanding the course requirements and its assessments (ENT600)

The second phase;

Address existing environmental challenges and global and local government policies and regulations, reports and existing issues in the market perspective

The third phase;

Understand the problems/issues/crisis and find solutions or overcome problems/issues. Construct the problem statements and draft the objectives.

The fourth phase;

Generating and Selecting Ideas (choosing the Product Innovation Tools/Method – Design Thinking Process) and focus on creating and selecting the ideas that are dependent upon or related to the context of an event, a statement, or a concept. It provides contextual information to decode meaning and determine the significance of new difficulties, issues, and crises from the context's hints. Choosing an idea on a group basis by discussing prospective solutions or problem-solving with the help of group members; outlining ideas and conducting market research to distinguish the potential good or service in the market; or examining its accessibility, similarities, and other factors.

The fifth phase;

Intervention by the facilitator or lecturer's in-charge for the justifications and defense (preliminary presentations by students) associate to the product/service in terms of facts and figures from the newspaper cuttings, journal, government or ministry reports, established agency or foundation reports, global association or any ministries recognized reports, supporting formulas or calculations or statistical data, product fabrication/material management (type of materials use, prices and supplies, alternatives to suggested materials, reliability, flexibility and practicality of the materials, costing, software apps and tools, application to the IOS and Androids, electricity consumptions, potential speed, cost savings, maintenance and service estimation cost, potential demands and supply, market products/services (competitors product/service), demographic statistical data, economic reports, household consumption reports, financial data from the government agency, international organizations or associations & etc. (the final justification with the formula generation, model/unit improvements, costing assessment, pricing strategies, customers demand and product design, attributes and performance). And, receiving clearance for the development of the proposed product or service after carefully reviewing the results of the market research.

The sixth phase;

Reviewing concepts based on "intervention" results and reexamining data, numbers, and product attributes. Putting the notion in writing with thorough evidence and conclusions. Product/Service Design - Sketching ideas for product measurement, design, colour, attributes, and appearance as well as defining product components and technology applications like software apps. For the apps, specific coding and programming processes are needed to display their features in reports or other reports. creating the slides for a live class presentation, recording the presentation for the competition, and reporting process.

It could further support the impact of design process intervention by participating in the competition. It was demonstrated how much this has an impact on students' originality and creativity. The Technopreneur Creation Programme (Tech-Create PriDe 2023) must be entered by ENT600 students during the preceding semester, from October 2022 to March 2023. Two groups received consolation prizes, while two more received silver and bronze medals, respectively.

## **CONCLUSION**

As to encourage students to learn more effectively and to find the subject more engaging, the teaching methodology should have the ability to alter the students' learning behaviours. By fostering a positive learning atmosphere through group discussions, interaction between groups to solve problem, peer brainstorming, and collaborative project work, lecturers can increase their students' engagement. By giving students timely feedback, mentoring them, and implementing "intervention strategies" to define problems clearly, put the necessary information in place, and come up with solutions that go beyond their field of expertise, creative education can be improved. The finest answers for difficulties and comprehensive solutions to the challenges could be produced by combining information from many ideas and multiple views. The best results or solutions are produced during the product development stages when left and right brainers collaborate.

## **ACKNOWLEDGEMENTS**

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