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A Model for Individual Creative Tasks for Students in TVET: Analysis and Illustrative Applications with Examples

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ABSTRACT: In the article a conceptual model is developed with the core strategies and stages of its implementation as well as the framework for integration process, focusing in identifying core competences incorporating creative task into the curriculum and proving opportunities for showcasing student work. In the text are listed examples of creative task in the field of Electrical science, Electronics and Computer science. It examines the critical role of creativity and critical thinking in secondary vocational education, emphasizing the implementation of innovative pedagogical models. It identifies key challenges faced by students in engaging with individual creative tasks, including the generation of novel ideas, the development of effective problem-solving strategies, efficient time management, and the articulation of concepts. The article highlights the Design Thinking process as a human-centered approach to problem-solving, alongside the Project-based Learning (PBL) framework, which facilitates the application of theoretical knowledge to authentic, real-world projects. By integrating these methodologies, educators can enhance students' practical skills and better prepare them for future vocational endeavors. Furthermore, the article provides illustrative examples of creative tasks, such as designing marketing campaigns, developing product prototypes, and formulating business plans, which serve to contextualize students' learning experiences. Ultimately, this exploration aims to equip educators with effective strategies for fostering creativity within vocational education, thereby enriching student learning outcomes and professional readiness.

KEYWORDS: creativity, creative tasks, critical thinking, design thinking, TVET.

INTRODUCTION

In secondary TVET, students are often tasked with engaging in creative activities to enhance their skills and prepare for real-world challenges (*Beghetto et al., 2019*). These tasks present a range of challenges, including generation of innovative ideas, ideation, problem-solving, time management, and effective communication (*Purwaningrum et al., 2022*). To address these challenges, educators can adopt various pedagogical models and approaches that cultivate creativity and critical thinking (*Kleiman, 2014; Martin et al., 2022*). Creative tasks have been explored as a strategy to increase student engagement (*Benton, 2016*) and as a valuable assessment tool (*Colson et al., 2022*). Researchers such as *Jalinus et al*. (2023), *Theriault & Stone* (2021), *Janke et al*. (2015), and *Mroczek-Żulicka et al*. (2020) have examined the integration of creativity into various teaching and learning contexts, including geography, tourism, and STEM education. *Sharifovna et al.* (2020) have explored strategies for "developing creative abilities in both teachers and students".

Creativity is increasingly recognized as crucial competency in TVET, with different occupations requiring specific creative abilities (*Fischer & Barabasch, 2021*). *Divergent* and *convergent thinking* are identified as key aspects of creativity across various professions. Vocational schools are actively working to develop students' critical and creative thinking skills, which are essential for producing skilled and adaptable workers (*Atamtajani & Putri, 2020*). The design and implementation of educational technical tasks play a significant role in cultivating these skills among future technology teachers and TVET professionals (*Dubovyk, 2020*). Such tasks, when structured as a system, enable students to apply knowledge from diverse disciplines, such as drawing and physics, to solve technical problems. This integrated approach promotes creative development and prepares students for the complexities of future careers. *Design Thinking* and *Project-Based Learning* (PBL) are effective models for nutrure creativity in TVET. Design Thinking emphasizes empathy, problem definition, ideation, prototyping, and testing, while PBL engages students in authentic, real-world projects that require creative problem-solving and collaboration (Kleiman, 2014). In the context of secondary vocational education, creative tasks can include designing marketing campaigns, developing product prototypes, creating websites, organizing events, designing sustainable packaging solutions, producing media content, or developing comprehensive business plans. By

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integrating these models and examples, students can enhance their creative thinking, problem-solving abilities, and practical expertise in their respective vocational fields.

METHODOLOGY

This study presents a new **Model for Individual Creative Tasks for Students in TVET**, outlining its design, implementation steps, and evaluation. The methodology combines theoretical model development, practical implementation design, and a strategic analysis framework to ensure the feasibility and relevance of the proposed model in real-world applications.

The first stage of the research involved the **design and conceptualization of the model**. This process was informed by a comprehensive review of existing theories, best practices, and models in the relevant field (e.g., education, business, healthcare). The model was developed through the following steps:

- *Literature review:* A critical review of existing models and frameworks was conducted to identify gaps or limitations that the proposed model aims to address. Sources included academic articles, case studies, and reports on similar models used in various sectors.
- *Theoretical foundations:* The model was grounded in relevant theories (e.g., learning theory, organizational theory), ensuring that it draws from established knowledge while offering innovative solutions to identified challenges.
- *Key components and principles*: The model's core components were defined, along with guiding principles that form its theoretical backbone. The process involved aligning the model with the desired outcomes and objectives relevant to its field of application.

Following the model design, the research focused on **developing a structured framework for its implementation**. This stage outlines the practical steps necessary to apply the model in a specific context. The implementation steps were designed with attention to feasibility, scalability, and adaptability. Key elements include:

- *Step-by-step process:* The model is broken down into distinct stages or phases, each representing a key component of the implementation process. These steps are designed to be sequential or adaptable based on the specific needs of the target environment.
- *Resource requirements*: The necessary resources (e.g., personnel, technology, infrastructure) for successful implementation were identified, with a focus on ensuring that the model can be applied in diverse settings.
- *Timeline and milestones*: A proposed timeline for implementation was created, identifying key milestones to track progress and ensure that the model is applied effectively and efficiently.
- *Stakeholder involvement*: The role of various stakeholders (e.g., teachers, managers, students, employees) was considered, ensuring their participation at different stages of implementation to enhance the model's success.

Design of the Model for Individual Creative Tasks in TVET

Engaging in diverse creative tasks is an integral aspect of skill development and preparation for real-world challenges in secondary vocational education. The ability to generate innovative ideas, solve problems efficiently, manage time effectively, and communicate ideas clearly is essential for success in vocational careers. This document explores various models and approaches that educators can employ to foster creativity and critical thinking among students in vocational education. It also provides specific examples of creative tasks that students can undertake to apply these approaches throughout their educational journey. Tasks such as designing marketing campaigns, developing prototypes, creating websites, organizing events, and more offer students the opportunity to enhance their creative thinking, problem-solving skills, and practical knowledge within their vocational field.

- ***The Design Thinking Process***

The Design Thinking process is a highly effective model for students in secondary vocational education. This human-centered approach emphasizes empathy with users, precise problem definition, ideation, prototyping, and testing. By utilizing Design Thinking, students can develop a profound understanding of the needs and preferences of end users, which is crucial for creating practical and user-friendly solutions.

The Design Thinking Process serves as a foundational methodology in this study. It is structured around five key stages:

- *Empathize*: Students engage with end-users to understand their needs and experiences. This stage involves interviews, surveys, and observational studies to gather insights that inform the problem definition.

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- *Define:* Based on the insights gathered, students articulate the specific problem they aim to address. This stage emphasizes clarity and precision in problem definition, ensuring that the focus remains on user needs.
- *Ideate:* In this brainstorming phase, students generate a wide range of ideas and potential solutions. Techniques such as mind mapping and sketching are employed to visualize concepts and encourage creative thinking.
- *Prototype*: Students create tangible representations of their ideas, which can take the form of models, sketches, or digital prototypes. This hands-on approach allows for experimentation and exploration of different solutions.
- *Test:* Feedback is gathered from users and peers to evaluate the prototypes. This iterative process encourages students to refine their ideas based on real-world input, fostering a mindset of continuous improvement.

➢ ***Interdisciplinary Collaboration (IC)***

Interdisciplinary Collaboration involves integrating knowledge and skills from various fields to tackle complex problems. This methodology includes:

- *Cross-Field Projects*: Students collaborate with peers from different vocational disciplines, fostering a diverse skill set and broadening their perspectives.
- *Diverse Skill Sets*: By working together, students learn to appreciate the value of different expertise and how it contributes to innovative solutions.

➢ ***Supportive Learning Environment (SLE)***

Creating a Supportive Learning Environment is crucial for fostering creativity. This methodology focuses on:

- *Risk-Taking*: Students are encouraged to take risks in their creative endeavors, knowing that failure is a part of the learning process.
- *Constructive Feedback*: Regular feedback from peers and educators is provided to guide students in their creative tasks, promoting a culture of continuous improvement.

➢ ***Project-based Learning Approach***

The Project-based Learning (PBL) approach offers a valuable method for students, enabling them to work on real-world projects that require the creative application of their knowledge and skills. This experiential, hands-on approach fosters the development of critical thinking, problem-solving, and collaborative abilities, all of which are essential for success in future vocational careers.
Project-Based Learning is integrated into the curriculum to provide students with opportunities to work on authentic projects that require the application of their knowledge and skills. Key components of PBL include:

- *Real-World Projects*: Students engage in projects that address actual problems faced by local businesses or communities, enhancing the relevance of their learning.
- *Collaboration*: Students work in teams, promoting collaboration and communication skills. Group dynamics are facilitated through structured roles and responsibilities.
- *Critical Thinking*: PBL encourages students to analyze problems, evaluate solutions, and make informed decisions, thereby enhancing their critical thinking abilities.

➢ ***Student Projects with Industry for Enhanced Learning***

Collaborative projects with industry present a unique opportunity to enhance student learning by allowing them to apply vocational knowledge in real-world contexts. These projects facilitate practical experience, skill development, and the acquisition of competencies essential for future careers (*TVET, 2022*). However, the design, organization, and management of such projects pose significant challenges for educators. To address these challenges, educators can adopt the best practices derived from successful project experiences (*Hillon et al., 2012*). These best practices include clearly defining project objectives and expected deliverables, fostering strong partnerships with industry professionals, ensuring students have access to adequate resources and support, integrating industry feedback at key project stages, and providing opportunities for reflection and assessment. Following these guidelines helps ensure that industry-aligned student projects are not only enriching learning experiences but are also sustainable and feasible to manage (*Du, 2002*). Moreover, integrating research elements, student competitions, addressing industry needs, enhancing laboratory development, and incorporating elements of enjoyment into course projects has been shown to improve the quality of Mechatronics education and boost student interest in engineering.
Industry Engagement (**IE**) connects students with real-world professionals, enhancing their learning experience. This methodology includes:

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- *Partnerships*: Collaborations with local businesses and organizations provide students with insights into industry practices and expectations.
- *Mentorship Opportunities*: Students have access to mentors who guide them through their projects, offering valuable advice and support.

Framework for Incorporating Individual Creative Tasks into TVET Programs

Developing a framework for integrating individual creative tasks into vocational education programs requires careful planning to align these tasks with the program's educational objectives and learning outcomes. This framework must account for the specific characteristics of each vocational field, offering students opportunities to demonstrate creativity and problem-solving skills within their disciplines (*Zhang et al., 2023*). The following components form the basis of such a framework:

1. **Identification of Core Competencies**: Determine the critical skills and knowledge that students need to develop in their vocational field.
2. **Integration of Creative Tasks**: Identify points within the curriculum where individual creative tasks can be embedded. These tasks should enable students to apply creativity, critical thinking, and problem-solving abilities in a relevant and practical manner.
3. **Implementation Strategies**: Define the specific methods for executing creative tasks within the vocational program. This may include providing clear guidelines, offering necessary resources, facilitating peer collaboration and feedback, and incorporating reflection and evaluation opportunities.
4. **Assessment and Feedback**: Establish mechanisms to evaluate student performance on creative tasks and deliver timely feedback (*Hillon et al., 2012*). This can include rubrics, peer evaluations, mentor input, and self-assessment exercises. Additionally, students should be given platforms to showcase their creative work, such as exhibitions or presentations, both within the program and to external stakeholders.

Benefits of Incorporating Individual Creative Tasks

Integrating individual creative tasks into vocational education offers numerous advantages for both students and educators. By identifying core competencies and embedding creative tasks, students gain the chance to apply their vocational knowledge in practical scenarios, leading to a deeper understanding of the subject matter. This hands-on approach fosters greater engagement and critical thinking, equipping students with a comprehensive skill set valuable in their future careers.

Moreover, the structured approach to implementing creative tasks offers educators a clear framework to guide students throughout the process, ensuring that these tasks are aligned with program goals. Through established assessment and feedback mechanisms, educators can evaluate student progress and offer constructive guidance to support continuous improvement in creative endeavors. Showcasing student work through exhibitions or presentations not only recognizes their accomplishments but also allows them to gain visibility from external stakeholders, opening doors to potential networking and career opportunities.

This model incorporates essential elements of the Design Thinking process and Project-based Learning, organized into systematic steps for effective implementation.

Procedure for Implementing the Model for Individual Creative Tasks in TVET

To implement these models and approaches, students can engage in a variety of creative tasks. Examples include designing marketing campaigns for local businesses, developing prototypes for new products, creating websites for small businesses, or organizing and executing events. These tasks provide students with practical, real-world experience while allowing them to showcase their creativity and applied knowledge.

In subsequent sections, we will explore these models and examples in greater detail, offering insights and guidance for educators and students on effectively implementing and participating in these creative tasks. Through these efforts, students not only enhance their practical skills but also gain a deeper understanding of their chosen vocational fields.

Implementing the Design Thinking Process in Secondary Vocational Education

The Design Thinking process is an essential tool for fostering creativity and enhancing problem-solving skills among students in secondary vocational education. By focusing on empathy with users and defining problems from a human-centered perspective, students gain deeper insight into the practical applications of their vocational skills. Educators can guide students through real-world

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scenarios, where they apply the Design Thinking process to create user-friendly solutions, cultivating a mindset rooted in empathy and innovation.

Integrating Project-based Learning in Vocational Education

Project-based Learning allows students in secondary vocational education to work on authentic, real-world projects that simulate actual challenges and scenarios (Bahari et al., 2022). Through PBL, students gain practical experience in problem-solving, collaboration, and critical thinking, laying a solid foundation for their future careers. Educators can support PBL by designing meaningful projects that require students to apply their vocational expertise in creative and innovative ways. By engaging in such projects, students can develop a well-rounded skill set essential for vocational success.

Diverse Examples of Creative Tasks for Vocational Students

Students can participate in a wide range of creative tasks that align with their vocational interests. For example, they might design sustainable packaging solutions for products, create short films or animations to promote vocational concepts, or develop comprehensive business plans for new ventures. These tasks encourage students to think critically and innovatively while applying their vocational knowledge in concrete, real-world projects.

By incorporating these models and examples into the educational framework, students in secondary vocational education can further enhance their creative thinking, problem-solving skills, and practical expertise. Embracing these approaches equips students with the necessary tools to excel in their chosen vocational paths and prepares them to face professional challenges with confidence.

Transforming Student Projects into Value-Added End Products

To transition student projects from mere academic exercises into value-added end products, educators can implement strategies that enrich the overall learning experience while contributing lasting value to the course content (*Zhang et al., 2023*). One such strategy is fostering collaboration between students and industry professionals (*Hillon et al., 2012*). This may involve guest speakers, industry mentors, or partnerships with local businesses (*Liu et al., 2022*). Engaging with industry professionals allows students to gain practical insights and receive valuable feedback, thereby enhancing the relevance of their projects and their understanding of vocational demands (*Hillon et al., 2012*).

Additionally, educators can encourage students to document and share their projects in ways that benefit future cohorts. This might involve the creation of detailed project reports, instructional videos, or interactive presentations that outline the project's process and outcomes. These materials can serve as valuable resources for future students, contributing to course content and enhancing the learning journey for subsequent generations. Summary is given in ***Table. 1.***

Table 1. Creative Task Problematics: summary

PROBLEMATICS	DETAILS
SPECIFIC CHALLENGES STUDENTS FACE IN CREATIVE TASKS WITHIN SECONDARY VOCATIONAL EDUCATION	✓ FINDING INNOVATIVE IDEAS ✓ DEVELOPING EFFECTIVE PROBLEM-SOLVING STRATEGIES ✓ MANAGING TIME EFFICIENTLY ✓ EFFECTIVELY COMMUNICATING THEIR IDEAS
DESIGN THINKING PROCESS APPLICATION IN VOCATIONAL EDUCATION	✓ EMPATHIZING WITH USERS ✓ DEFINING THE PROBLES ✓ IDEATING POTENTIAL SOLUTIONS ✓ PROTOTYPING ✓ TESTING
EXAMPLES OF CREATIVE TASKS THAT STUDENTS MIGHT UNDERTAKE IN TVET	✓ DESIGNING A MARKETING CAMPAIGN FOR A LOCAL BUSINESS ✓ DEVELOPING A PROTOTYPE FOR A NEW PRODUCT ✓ CREATING A WEBSITE FOR A SMALL BUSINESS ✓ ORGANIZING AND EXECUTING AN EVENT

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	✓ DESIGNING SUSTAINABLE PACKAGING SOLUTIONS ✓ CREATING SHORT FILM OR ANIMATION ✓ DEVELOPING A BUSINESS PLAN FOR A NEW VENTURE

Step 1: Identify Core Competencies

- Objective: Determine the essential skills and knowledge that students need to develop within their vocational field.
- Action: Collaborate with industry stakeholders to define competencies relevant to the specific vocational area.

Step 2: Define the Creative Task

- Objective: Clearly outline the individual creative task that aligns with the identified competencies.
- Action: Develop a task description that includes objectives, expected outcomes, and relevance to real-world applications (e.g., designing a marketing campaign, creating a prototype).

Step 3: Provide Guidelines and Resources

- Objective: Equip students with the necessary tools and information to complete the task.
- Action: Offer clear instructions, access to materials, and examples of successful projects. Include resources for research and inspiration.

Step 4: Facilitate Ideation and Planning

- Objective: Encourage students to brainstorm and plan their approach to the task.
- Action: Organize brainstorming sessions where students can share ideas and collaborate. Use techniques like mind mapping or sketching to visualize concepts.

Step 5: Implement the Design Thinking Process

- Objective: Guide students through the stages of the Design Thinking process to develop their solutions.
- Action:
  - Empathize: Encourage students to understand the needs of end-users.
  - Define: Help them articulate the problem they are addressing.
  - Ideate: Facilitate the generation of multiple solutions.
  - Prototype: Have students create a tangible representation of their ideas.
  - Test: Allow for feedback and iterations based on user input.

Step 6: Assessment and Feedback

- Objective: Establish mechanisms for evaluating student performance and providing constructive feedback.
- Action: Use rubrics, peer evaluations, and mentor input to assess the creative tasks. Encourage self-reflection on their learning process.

Step 7: Showcase and Reflect

- Objective: Provide opportunities for students to present their work and reflect on their learning experience.
- Action: Organize exhibitions or presentations where students can showcase their projects to peers, educators, and external stakeholders. Facilitate discussions on what they learned and how they can apply it in the future.

Step 8: Iterate and Improve

- Objective: Encourage continuous improvement in creative tasks and learning outcomes.
- Action: Gather feedback from students and stakeholders to refine the task framework and implementation strategies for future iterations.

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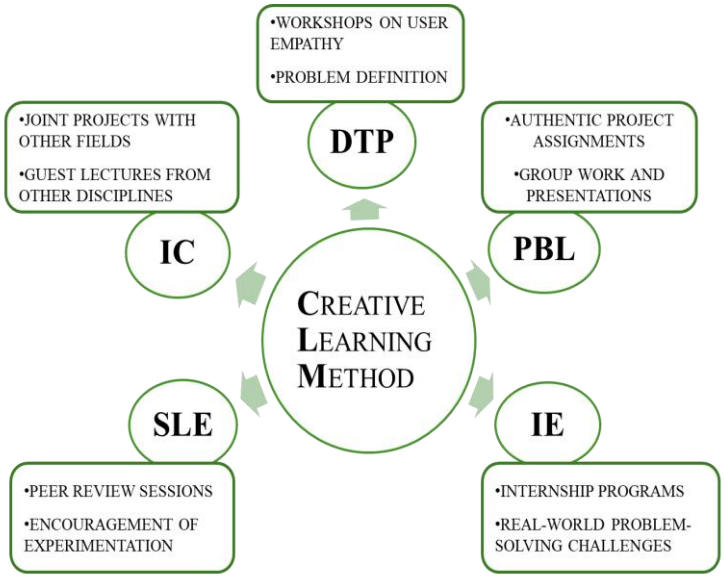

Figure 1. Creative Learning Model for TVET
Author's source.

The model in ***Figure 1***. is structured and consists of the following:

A. *Design Thinking Process (DTP):* Empathize Define Ideate Prototype Test.
B. *Project-Based Learning (PBL):* Real-World Projects Collaboration Critical Thinking.
C. *Interdisciplinary Collaboration (IC):* Cross-Field Projects, Diverse Skill Sets.
D. *Supportive Learning Environment (SLE):* Risk-Taking, Constructive Feedback.
E. *Industry Engagement (IE):* Partnerships, Mentorship Opportunities.

Examples of creative tasks specifically tailored for students in TVET in the field of Electrical Science and Electronics and Computer Science:

Practical and concrete list of proposals for Creative Tasks:

1. Developing a Mobile Application: Students can design and develop a mobile app that addresses a specific need within their community, such as a local event planner or a health tracking app.
2. Creating a Website for a Non-Profit Organization: Students can work with a local non-profit to create a user-friendly website that showcases their mission, services, and upcoming events, incorporating features like donation buttons and volunteer sign-up forms.
3. Building a Game Prototype: Students can design and develop a prototype for a simple video game, focusing on gameplay mechanics, user interface, and graphics. This task can involve storytelling and character development.
4. Implementing a Cybersecurity Awareness Campaign: Students can create a campaign to educate their peers about cybersecurity best practices, including designing posters, social media content, and hosting workshops.
5. Developing an E-commerce Platform: Students can create a basic e-commerce website for a local business, integrating features such as product listings, shopping cart functionality, and payment processing.
6. Creating an Educational Video Tutorial: Students can produce a short video tutorial on a specific programming language or software tool, demonstrating its features and providing tips for beginners.
7. Designing a Database Management System: Students can develop a database management system for a small business, focusing on data organization, retrieval, and user interface design.
8. Organizing a Hackathon: Students can plan and execute a hackathon event, including logistics, marketing, and creating challenges for participants to solve within a limited timeframe.

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9. Creating a Virtual Reality Experience: Students can design a simple virtual reality experience or simulation that allows users to explore a specific environment or concept, such as a historical site or scientific phenomenon.
10. Creating an Educational Animation or Simulation: Students can design a short educational animation or interactive simulation to explain complex computer science concepts, such as algorithms, machine learning, or data structures.
11. Developing a Comprehensive IT Infrastructure Plan for a Startup: Students can create a detailed IT infrastructure plan for a startup, including recommendations for hardware, software, cloud solutions, and network security measures.
12. Designing a Smart Home Energy Management System: Students can develop a system that optimizes energy consumption in a home, integrating renewable energy sources such as solar panels with smart meters to monitor and reduce electricity usage.
13. Developing a Prototype for a Portable Power Bank: Students can design and build a prototype of an efficient, eco-friendly power bank that uses alternative energy sources such as solar or kinetic energy for charging.
14. Creating a Website for an Electronics Repair Business: Students can develop a website for a local electronics repair business, featuring services, customer reviews, and appointment scheduling functionalities.
15. Organizing an Electronics Workshop or Competition: Students can organize an event where participants build small electronics projects, such as programmable LED displays, drones, or remote-controlled vehicles.
16. Designing Sustainable Circuit Boards: Students can work on creating eco-friendly printed circuit boards (PCBs) using recyclable materials, minimizing toxic chemicals in production processes to promote sustainability in electronics design.
17. Creating an Instructional Video on Circuit Design and Assembly: Students can produce an educational video demonstrating how to design, assemble, and troubleshoot basic electronic circuits, aimed at beginners in the field.
18. Developing a Business Plan for a Solar Energy Startup: Students can draft a comprehensive business plan for a startup that provides solar panel installation and maintenance services, focusing on promoting renewable energy and reducing carbon footprints.

CONCLUSION

The article presents a comprehensive conceptual model, outlining the strategies and stages involved in integrating creative interventional education programs. The model emphasizes the identification of core competencies and the incorporation of creative tasks into the curriculum. The last part of the article is given a variety of practical concrete examples of creative tasks tailored to the fields of electrical science, electronics, and computer science. In the paper emphasis is made on the significance of creativity and critical thinking in TVET. Students often encounter challenges when engaging in creative tasks, including ideation, problem-solving, time management, and effective communication. To address these challenges, educators can employ various pedagogical models, such as Design Thinking and Project-Based Learning. By integrating creative tasks into the curriculum, students can develop essential skills, including empathy, innovation, and collaboration. These skills not only enhance their technical expertise but also prepare them for the multifaceted demands of the modern workforce.

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