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CiptaSTEAM: An Integrative Holistic Learning Model to Enhance Students' Knowledge and Skills Competencies Simultaneously

Zulfi Hendri[1], Nur Hayati[2], Dwi Wulandari[3]
Art Education Department, Faculty of Languages, Arts, and Cultures, Universitas Negeri Yogyakarta[1,3]
Early Childhood Education Teacher Education, Faculty of Education and Psychology, Universitas Negeri Yogyakarta[2]
Jl. Colombo No.1, Karang Malang, Caturtunggal, Kec. Depok, Kabupaten Sleman, Daerah Istimewa Yogyakarta 55281, Indonesia
E-mail: nurhayati@uny.ac.id

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ABSTRACT

Appreciation, innovation, and the competencies of knowledge and skills in learning are components that cannot be separated in both early education (Kindergarten-Elementary) and secondary education (Junior-High School). Unfortunately, educators have faced difficulties in finding a learning model that can simultaneously facilitate both knowledge and skills within a unified learning experience. The STEAM concept, which encompasses the principles of practice- and project-based learning, still requires reevaluation to be effectively integrated with the distinctive features of learning at both early and secondary education levels. This research aims to develop an integrative, holistic learning model to enhance knowledge and skill competencies based on STEAM simultaneously. This R&D study was conducted in six steps : (1) needs analysis, (2) literature review, (3) planning and development of the initial model, (4) pilot testing, (5) revision of the main model and field testing, and (6) final model revision. The study resulted in a learning model called CiptaSTEAM with the following steps: 1) Analyse, 2) Sketch/Design, 3) Select media, 4) Test sketch/design, 5) Revise work/product, 6) Presentation, 7) Evaluation. The learning syntax has been proven to be applicable in early education (Elementary). Overall, the integrative holistic learning model has been effective in increasing students' engagement and enthusiasm for learning in a 3rd-grade elementary classroom.

INTRODUCTION

Knowledge and skill competencies in learning are two components that cannot be dichotomised. (Burhanudin, 2016; Pamadhi, 2007; Retnowati & Bambang, 2010). For example, in art education, the outcomes of learning often do not lead to significant innovation, as students frequently acquire and experience theoretical and practical aspects separately. Art education needs to be mastered holistically to enhance creativity, fine motor skills, concentration, and self-confidence, so that children are prepared to face future challenges. (Ambarsari et al., 2024). Simultaneously and dynamically, knowledge and skill competencies support each other to achieve comprehensive and holistic learning outcomes in both art education and other disciplines. Among the various existing learning models, most separate these two components. The scientific learning approach required by the Indonesian 2013 Curriculum, for example, in the context of art education, tends to focus more on knowledge competencies alone. This generally complicates educators' design and implementation of art education lessons in the classroom. As an alternative, educators often resort to using different and separate learning models to achieve the knowledge competency targets in Competency Standard (KD) 3 and skill competency in Competency Standard (KD) 4 as mandated by the curriculum.

The development of pedagogical concepts that support holistic efforts across various fields of

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study, particularly in art education, aims to produce more comprehensive and productive competencies, encompassing Science, Technology, Engineering, Art, and Mathematics (STEAM), as well as practice- and project-based learning. These concepts are considered to be the closest to meeting these needs. STEAM, which is an integrated approach between Science, Technology, Engineering, Art, and Mathematics, provides a dynamic space for creative and solution-oriented thinking and action through transdisciplinary learning activities (Colucci-gray et al., 2017; Hendri & Wulandari, 2022; Mu'minah & Suryaningsih, 2020; Prastyo et al., 2021; Zharylgassova et al., 2021). However, the discourse on STEAM is still at the level of a broad approach paradigm, meaning that its technical application in the classroom continues to be a subject of ongoing discussion (Colucci-gray et al., 2017). Meanwhile, the practice and project-based learning methods, which are inherently characteristic of STEAM education (Putri & Taqiudin, 2021; Zharylgassova et al., 2021), are more applicable concepts that can be implemented by educators in various learning settings. However, the concepts and implementation of both practice and project-based learning still need to be further examined and synergised to align with the needs and distinctiveness of specific disciplines, particularly art education, which encompasses aspects of aesthetics, critique, history, and creation. The integration of art into elementary school learning often results in limited time for art education, which is insufficient and restricts students' exploration and engagement with artistic activities. (Marni et al., 2023). The limitation of learning time presents a challenge for teachers to optimise learning in elementary schools, ensuring that students fully understand the essence of the material.

The challenges of art education in elementary schools today include the need for teachers to shift from the previous habit of students being passive to becoming active in creating artistic expressions (Jun, 2023). Research by Rofian (2016) shows that students are often given examples by their teachers, which causes them to become less accustomed to generating their ideas. The courage of students to explore their artistic ideas depends on the teacher's motivation, the media used, and the availability of facilities and infrastructure at the school. This is also found in the study by Iraqi et al. (2023), which describes the barriers in teaching Arts, Culture, and Crafts (SBdP) in grade 5 elementary classrooms, including students' level of understanding, classroom management skills of the teacher, the teacher's expertise in the arts, facilities, teaching media, and the higher complexity of the curriculum. Another study by Maharani (2024) suggests that the application of constructivist learning theory in art education at SDN Gadingkasri can enhance students' critical thinking and problem-solving abilities while fostering independence. The urgency of implementing the STEAM approach in elementary art education lies in its ability to encourage students to actively build knowledge through contextual, creative, and project-based learning experiences, aligning with the principles of constructivism (Nuragnia et al., 2021).

The optimisation of the learning model in elementary schools that integrates STEAM is expected to enhance creativity and student engagement. Previous studies have not extensively developed STEAM-based learning models at the elementary level, therefore, this research will focus on: 1) the structured integration of the STEAM approach with art education at the elementary level; 2) the enhancement of creativity and student engagement through art projects based on exploration, experience, science, and simple technology; and 3) providing pedagogical and practical solutions to address teachers' challenges and the limitations of media in classroom learning.

Art Education

Pendidikan seni adalah segala usaha untuk meningkatkan kemampuan kreatif ekspresif anak didik dalam mewujudkan kegiatan artistik yang berdasarkan nilai-nilai estetika. Melalui pendidikan seni, kemampuan cipta, rasa dan karsa anak diolah dan dikembangkan. Penciptaan seni rupa merupakan pembelajaran yang sangat kompleks karena melibatkan proses kognitif yang tinggi atau High Order Thinking Skill (HOTS) dan proses design thinking; pemahaman terhadap alat, bahan, dan teknik; kemampuan berinovasi; rasa estetika; kepekaan sosial maupun inviromental untuk mengembangkan tema; hingga kemampuan untuk merealisasikan wujud-wujud artistik. Proses kreatif penciptaan seni bertmpu pada kreativitas yang menggunakan imajinasi dan ide-ide orisinal menjadi salah satu keahlian penting dan prioritas utama pendidikan abad 21. Kreativitas adalah proses kompleks yang memerlukan hubungan antara orang, proses, produk, dan konteks sosial dan budaya (Feldman, 1999; Sternberg, 1999). baru tetapi oleh pengetahuan sebelumnya atau oleh kombinasi keduanya (Plucker & Beghetto,

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2004). Pembelajar seni rupa mengekspresikan pikiran dan emosinya dengan mengorganisir elemen visual (garis, bentuk, warna, tekstur, dan seterusnya) menggunakan prinsip komposisi (keseimbangan, harmoni, kesatuan, ritme, dan seterusnya). Kreativitas mungkin tidak secara khusus diberikan oleh proses mental untuk menciptakan ide-ide.

Learning Model

Learning models are teaching plans that involve specific learning patterns, characterised by activities between students and teachers, or commonly referred to as syntax in the learning event. According to Bruce Joyce (1980, in Fauzan, 2019), the characteristics of learning models include: (1) the sequence of learning activities, often referred to as syntax; (2) the social system or role of the educator in the learning process; (3) the principle of reaction, which refers to the teacher's efforts to respond and guide students; and (4) the supporting system, which includes several factors that must be owned and considered by teachers when using the model and its impact on learning.

Learning models are developed to help students acquire information, ideas, skills, ways of thinking, and methods of self-expression (Joyce et al., 2009). Early childhood education provides more care services and prepares children academically to enter elementary school (Getswicki, 2007). The curriculum for young children aims to provide holistic, integrated learning in both academic and non-academic fields (Bredekamp & Copple, 1996). Quality preschool and elementary school education should stimulate various aspects of a child's development, including social-emotional, religious and moral values, cognitive, and other academic skills, to help children learn throughout their lives (Bautista et al., 2016).

Elementary school learning is essential for stimulating early life stages, as this is the period during which all vital aspects of a child's life develop. Childhood education can be understood as a process that stimulates various aspects of child development, including religious and moral values, physical and motor skills, cognitive abilities, language skills, social-emotional development, and artistic expression. Through early childhood education, it is hoped that children can optimise their abilities for future stages of life. Elementary school-age children learn by exploring real objects, which ultimately supports their thinking and learning abilities involving mental processes and the physical environment (Hsiao et al., 2017). Through play, children's curiosity can be answered by frequently observing the environment, allowing the information gathered to build knowledge concepts.

A learning model for children can be chosen based on different situations and conditions (Sujiono, 2009). The development of learning models is designed to build syntax, a social system that facilitates the progression of learning steps, enhances the social system, supports learning systems, and assesses the impact of learning (Joyce et al., 2009). The development of learning models is expected to explore supporting factors for successful learning and improve student achievements. The development of an art learning model can serve as a medium for enhancing the academic abilities of elementary school children. The learning model in this research refers to the model developed by Joyce, Weil, & Calhoun (2009) which can be seen in Table 1.

STEAM, Practice-Based Learning, and Project-Based Learning

Among the various approaches and learning models available, STEAM, practice-based learning, and project-based learning are concepts that closely align with the natural conditions and needs of art education, where knowledge and skill competencies interact in a synergistic and simultaneous manner (Marín-Marín et al., 2021; Perignat & Katz-Buonincontro, 2018). STEAM consists of several distinctive components, including problem-solving through innovation and design, the connection between assessment, learning plans, and learning standards, the combination of multiple subjects within STEAM, a collaborative learning environment, process-based learning, and a focus on real-life occurrences.

Based on this situational analysis, there is a need for a learning model that can facilitate the integration of knowledge and skill competencies, allowing both to be implemented simultaneously within an interconnected learning framework. Therefore, this study aims to develop a holistic learning model that can dynamically facilitate the integration of Competency Standards (KD) 3 and KD 4 into a cohesive learning experience. Specifically, this research stems from the need for art education and connects it with the latest STEAM concepts in education. However, the learning model, which will be

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tested up to TKT 7 and 8, is assumed to apply more broadly to other subjects at various education levels, considering the potential flexibility of transdisciplinary art within STEAM.

Table 1. Model Development

a. Syntax	Syntax is the primary structure of a learning model, comprising a sequence of learning steps. This study develops a sequence of art learning steps to enhance the academic abilities (mathematics, language, natural sciences, and social sciences) of elementary school children.
b. Social System	The social system refers to the internalisation of relationships between various related parties, particularly in the development of the academic abilities of elementary school children.
c. Reaction Principles	The principle of reaction relates to the efforts of teachers and parents in developing the academic abilities of children, encompassing various roles such as educators, trainers, motivators, and evaluators.
d. Supporting System	The supporting system in this study comprises classroom facilities, libraries, play materials, and learning media relevant to the development of the model.
e. Impact	The developed model is expected to have a positive impact on the development of art education for both teachers and students, as well as affect the academic abilities of the students. Based on the explanation of the art learning model, it can be concluded that the model's components consist of syntax, social system, principle of reaction, supporting system, and impact. The expected impact should be realised in the learning process, allowing teachers to conduct reflection.

METHOD

This study employs the Research and Development (R&D) research method, a research approach used to produce specific products and test their effectiveness (Sugiyono, 2012). This R&D study was carried out by adapting the Borg and Gall Model (Borg & Gall, 1983), which consists of six stages as follows: (1) needs analysis, (2) literature review, (3) planning and development of the initial product form, (4) preliminary testing, (5) revision of the main product and field testing, (6) revision of the product based on the results of the main field testing, operational field testing, and final product revision. However, this study was conducted only up to the fifth step and took the sixth step only as the final product. The subjects of this study were third-grade students of one SD Negeri (State Primary School) in Yogyakarta. The data collection techniques used in this study included interviews and observations. The research instruments used were interview guidelines to determine how the learning model suited the needs and observation guidelines to assess the responses of teachers and students when the integrative, holistic STEAM learning model, incorporating knowledge and skills, was applied. The research instrument's items included: How was the previous learning conducted? What is the level of interest among third-grade students during lessons? How does the teacher deliver material in third-grade classes? Has art learning ever been integrated with STEM? The data collected was then analysed using the interactive analysis model by Miles, Huberman, and Saldana (2014), which includes data collection, data condensation, data presentation, and conclusion drawing. Data validity was ensured using source triangulation.

The research began by analysing empirical conditions (through a preliminary study) and conducting a literature review. During this phase, the concept of each subject, particularly art, was identified in relation to the direction of Arts and Culture learning outlined in the 2013 Curriculum, which focuses on the characteristics of art learners at the elementary and secondary levels. This was analysed based on empirical evidence from experts, educators, and professionals in curriculum development and learning strategies. The STEAM concept, along with project-based learning, one of its key characteristics, was comprehensively analysed in relation to its potential for development in the context of the study's needs. The output of this phase was a meta-analysis of the needs and theoretical foundations for developing the integrative, holistic learning model for KD 3 and KD 4.

The next phase involved designing an integrative, holistic learning model of knowledge and skill competencies, based on an analysis of learning needs and a literature review of the STEAM concept and project-based learning. This model aimed to facilitate the simultaneous implementation of KD 3 and

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KD 4. The result of developing this learning model design was used in preliminary testing, which was validated through expert judgment, followed by revisions.

The main field testing phase was conducted in two classes of the partner elementary school. The participants involved included one homeroom teacher, who also served as the Arts and Culture teacher, and 60 third-grade students. The teacher was trained to implement the developed learning model into the Lesson Plan (RPP) and to conduct the learning in class across four sessions, which form one cohesive theme or learning material. Observations were conducted during the lessons, with the teacher taking notes on evaluations simultaneously. The stages of this research are illustrated in Figure 1.

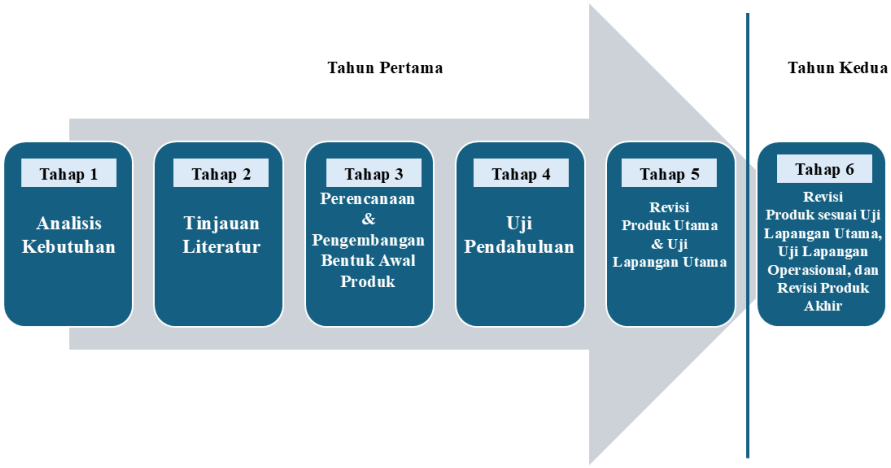

Figure 1. Research Flow

The development research of the integrative holistic learning model for knowledge and skill based on STEAM has been conducted up to stage 5, where the researcher has only revised the main product through main field testing and has not yet conducted a broader effectiveness testing phase.

RESULT AND DISCUSSION

In the 2013 Curriculum, this research specifically stems from the need for holistic and simultaneous knowledge and skill-based learning, linking it with the latest STEAM concepts in education. STEAM consists of several distinctive components, including problem-solving through innovation and design, the connection between assessment, learning plans, and learning standards, the combination of multiple subjects within STEAM, a collaborative learning environment, process-based learning, and a focus on real-life occurrences. The needs analysis results indicate that third-grade teachers without a background in art require knowledge and training in holistic and integrative visual arts content. Teachers need training on how to create a holistic and integrative Lesson Plan (RPP) that incorporates STEAM. Third-grade students have never received STEAM-based lessons, especially in the art classroom. Additionally, art education is still considered an optional subject, so neither teachers nor students fully appreciate the importance of enhancing their knowledge and skills in art. In the 2013 Curriculum, the components of knowledge and skills are interpreted separately in the concept of Competency Standards (KD), with number 3 for knowledge competencies and number 4 for skills competencies, as shown in the Figure 2.

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KOMPETENSI INTI 3 (PENGETAHUAN)	KOMPETENSI INTI 4 (KETERAMPILAN)
3. memahami pengetahuan faktual dengan cara mengamati dan menanya berdasarkan rasa ingin tahu tentang dirinya, makhluk ciptaan Tuhan dan kegiatannya, dan benda-benda yang dijumpainya di rumah, di sekolah dan tempat bermain	4. menyajikan pengetahuan faktual dalam bahasa yang jelas, sistematis dan logis, dalam karya yang estetis, dalam gerakan yang mencerminkan anak sehat, dan dalam tindakan yang mencerminkan perilaku anak beriman dan berakhlak mulia
KOMPETENSI DASAR	KOMPETENSI DASAR
3.1 mengetahui gambar dan bentuk tiga dimensi	4.1 menggambar dan membentuk tiga dimensi
3.2 mengetahui tanda tempo dan tinggi rendah nada	4.2 menyanyikan lagu dengan memperhatikan tempo dan tinggi rendah nada
3.3 mengetahui gerak tari kreasi daerah	4.3 meragakan gerak tari kreasi daerah
3.4 mengetahui karya seni rupa teknik tempel	4.4 membuat karya kolase, montase, aplikasi, dan mozaik

KOMPETENSI INTI 3 (PENGETAHUAN)	KOMPETENSI INTI 4 (KETERAMPILAN)
3. memahami pengetahuan faktual dan konseptual dengan cara mengamati, menanya dan mencoba berdasarkan rasa ingin tentang dirinya, makhluk ciptaan Tuhan dan kegiatannya, dan benda-benda yang dijumpainya di rumah, di sekolah dan tempat bermain	4. menyajikan pengetahuan faktual dan konseptual dalam bahasa yang jelas, sistematis, logis dan kritis, dalam karya yang estetis, dalam gerakan yang mencerminkan anak sehat, dan dalam tindakan yang mencerminkan perilaku anak beriman dan berakhlak mulia
KOMPETENSI DASAR	KOMPETENSI DASAR
3.1 memahami gambar cerita	4.1 membuat gambar cerita
3.2 memahami tangga nada	4.2 menyanyikan lagu-lagu dalam berbagai tangga nada dengan iringan musik
3.3 memahami pola lantai dalam tari kreasi daerah	4.3 mempraktikkan pola lantai pada gerak tari kreasi dearah
3.4 memahami karya seni rupa daerah	4.4 membuat karya seni rupa daerah

KOMPETENSI INTI 3 (PENGETAHUAN)	KOMPETENSI INTI 4 (KETERAMPILAN)
3. memahami pengetahuan faktual dan konseptual dengan cara mengamati, menanya dan mencoba berdasarkan rasa ingin tahu tentang dirinya, makhluk ciptaan Tuhan dan kegiatannya, dan benda-benda yang dijumpainya di rumah, di sekolah dan tempat bermain	4. menyajikan pengetahuan faktual dan konseptual dalam bahasa yang jelas, sistematis, logis dan kritis, dalam karya yang estetis, dalam gerakan yang mencerminkan anak sehat, dan dalam tindakan yang mencerminkan perilaku anak beriman dan berakhlak mulia
KOMPETENSI DASAR	KOMPETENSI DASAR
3.1 memahami reklame	4.1 membuat reklame
3.2 memahami interval nada	4.2 memainkan interval nada melalui lagu dan alat musik
3.3 memahami penampilan tari kreasi daerah	4.3 menampilkan tari kreasi daerah
3.4 memahami patung	4.4 membuat patung

Figure 2. Competency Standards (KD) for Arts and Culture Subjects For Grades IV-VI Of Elementary school (Kemendikbud, 2016)

This study was conducted in 2022, during a time when many schools were still implementing the 2013 Curriculum, which separates knowledge (KD3) and skills (KD4). However, the discourse surrounding the new curriculum, the Merdeka Curriculum, which is gradually being implemented, has sparked critical discussions on how the separation of knowledge and skills should shift towards achieving more holistic learning outcomes. In the Merdeka Curriculum, this is referred to as Capaian Pembelajaran (Learning Outcomes).

The implementation of art learning in the classroom, however, shows that the achievement of KD 3 and KD 4 can be carried out separately or simultaneously using an approach or learning model deemed suitable. Based on this needs analysis, a STEAM-based learning model was developed, where the material delivered to students goes beyond just colouring, cutting, and pasting. Instead, students are encouraged to delve deeper when creating their works by observing, asking questions, counting, engineering, and decorating their creations to make them more innovative.

Literature Review

In the literature review phase, the study references the concepts of STEAM, practice-based learning, and project-based learning. STEAM consists of several distinctive components, including problem-solving through innovation and design, the connection between assessment, learning plans, and learning standards, the combination of multiple subjects within STEAM, a collaborative learning environment, process-based learning, and a focus on real-life occurrences.

Planning and Development of Initial Product Form

The initial planning for the syntax of the learning model includes several activities: 1) Observing,

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2) Analysing, 3) Sketching/Designing, 4) Experimenting with the sketch/design, 5) Revising the work/product, 6) Presentation, and 7) Evaluation. This syntax is illustrated in Figure 3 below.

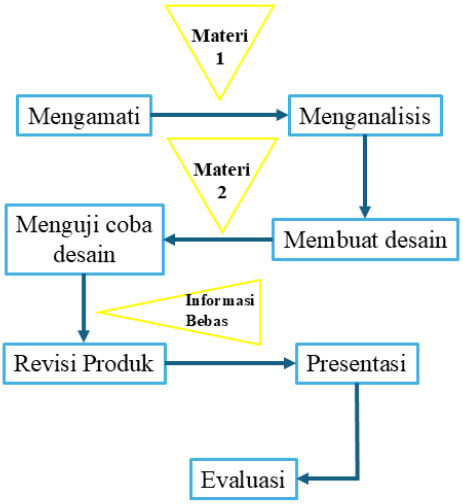

Figure 3. Initial Planning of the Learning Model

The students in the class will carry out the activity of observing by listening to the teacher's explanation while preparing the materials and tools for the art activity. This serves as the foundation for the teacher to create the first syntax in developing the learning model. Next, the students analyse the sketches drawn by the teacher as part of the apperception for the work they will create. The students then make their two-dimensional sketches and designs based on their ideas and creativity. Subsequently, the students experimented with their sketches and designs to create three-dimensional products, iteratively refining their work and showing it to other students and teachers to gather feedback. After receiving feedback from the teacher and other students, the students revise their work to improve it, then present it and finally undergo evaluation to complete the product, making it suitable for implementation to a broader audience.

Preliminary Testing

In the preliminary testing phase, a Focus Group Discussion (FGD) was conducted. The results of the Focus Group Discussion (FGD) included: 1) the need to align the learning model with the Merdeka Curriculum, 2) activities are relevant to the project module, 3) alignment with the learning achievement level for 3rd-grade elementary school students is necessary, and 4) the theoretical knowledge at the beginning of the lesson that teachers feel is important to convey.

Revision of the Main Product

At this stage, the revised product is the Lesson Plan (RPP) that was used. The RPP was created by adjusting it to the trial conditions, specifically the 3rd-grade elementary school setting during the first semester of the 2013 Curriculum. The 2013 Curriculum for 3rd-grade, semester 1, was used. One of the revised RPPs is for Theme 1: Growth and Development of Living Beings, following Natural Sciences/IPA, Technology/Engineering, SBdP/Art, and Math KDs as described in Table 2.

The learning activity is as follows. The session begins with the teacher greeting the students, checking attendance, and praying together according to each individual's religion and beliefs. Afterwards, the national anthem "Indonesia Raya" and the national song "Tanah Airku" are sung to foster a sense of nationalism. The lesson continues with a 15-minute reading routine to improve the students' literacy.

The teacher explains the learning objectives and initiates an apperception activity through a guessing game about animals or sharing experiences of visiting a zoo. The students then observe a fish brought by the teacher, watch a video about fish, and identify the characteristics of the fish as a living organism, such as movement and sensitivity to stimuli. Through discussion, the students conclude that

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a fish is a living being that exhibits characteristics such as movement, the need for food, and others.

The teacher invites the students to make a kinetic fish puppet by following steps that include designing a sketch, selecting materials, creating the fish's framework, and testing the materials and structures to ensure it can move. The students work in pairs to create the fish puppets, adding mosaic pieces with numbers from 1,000 to 10,000, and finishing the puppet by adding features like eyes and a mouth.

Table 2. Competency Standards (KD) Used

Natural Sciences/IPA	Technology/Engineering, SBdP/Art	Seni Budaya dan Prakarya (SBdP)/Art	Mathematics
3.1 Identifying the characteristics of living organisms (animals): movement 4.1 Demonstrating the movement of animals	3.1 Understanding the structure of a simple kinetic system 4.1 Constructing a simple kinetic system	3.1 Understanding the elements of visual art in decorative works 4.1 Creating decorative works	3.1 Explaining the properties of arithmetic operations on whole numbers 4.1 Solving problems involving the use of properties of arithmetic operations on whole numbers

Once completed, the students present their work in front of the class, explaining the creation process and sharing reflective experiences of the activity. The session ends with a group reflection on what was learned, which activities were enjoyed, and what information they would like to explore further. The regional song "Sinanggar Tulo" is sung, and a closing prayer is said to conclude the session in a religious atmosphere.

Main Field Testing

Main field testing was conducted in two classes at partner school, namely class 3A and 3B. In this activity, the learning model implemented by the students referred to the STEAM concept, as well as practice-based and project-based learning. This is illustrated in Figure 4 below

Figure 4. Field Testing of the Learning Model in Class 3 at the Partner Elementary School

Final Revision

Based on the product revisions and the trials that have been conducted, the syntax of the learning model includes several activities, namely: 1) Observing, 2) Analyzing, 3) Sketching/Designing, 4) Determining media, 5) Testing the sketch/design, 6) Revising the work/product, 7) Presentation, and 8) Evaluation. An additional step, determining the media, was added after sketching and designing. This was done because when transforming a two-dimensional sketch into a three-dimensional artwork, students require knowledge and skills in handling tools and materials for the creation process. Students often find it difficult to proceed with creating the artwork without first considering how the properties of the materials they use will influence the final product. Furthermore, the activity of testing the design and revising the work/product, which was previously only done once, is now revised to allow for

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continuous iterations until the desired revision of the work/product is achieved. This syntax is illustrated in Figure 5 below.

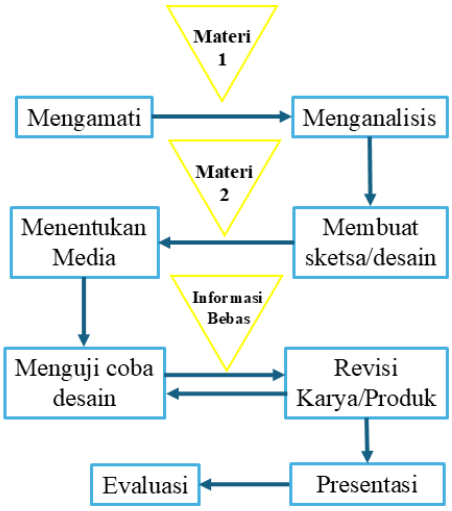

Figure 5. Final Revision of the CiptaSTEAM Learning Model

Based on the developments undertaken, the model that has been developed is named CiptaSTEAM. This name encapsulates the essence of the model, combining the Indonesian term "Cipta," meaning "creation" or "to create," with the acronym STEAM, which represents Science, Technology, Engineering, Art, and Mathematics. The CiptaSTEAM model was designed to emphasise the creative process, enabling students to integrate and apply their knowledge and practical skills in a continuous and interconnected manner. The intent is to foster an environment where students not only develop technical abilities but also interweave these skills with theoretical understanding from various disciplines, creating a more holistic learning experience.

In the context of Indonesian local wisdom, the concept of "Cipta" holds profound significance. It refers to the intellectual and spiritual force that enables individuals to comprehend, recognise, recall, and synthesise knowledge, ultimately leading to the creation of works that benefit society. This view resonates with the notion that creativity is not merely the act of producing something new but also involves applying knowledge in a context that serves the greater good of the community.

Moreover, within Indonesian cultural philosophy, "Cipta" is inherently linked to the triad of "Cipta, Rasa, Karsa," which represents the essential pillars of human existence. These terms, articulated by scholars such as Burnett, Selo Soemardjan, and Soelaiman Soemardi, translate to creativity ("Cipta"), feeling or emotional depth ("Rasa"), and will or intention ("Karsa") (Agus et al, 2021). These three components are considered necessary for cultivating a balanced and meaningful culture. They underscore the importance of integrating intellectual, emotional, and volitional elements to create works that reflect both individual and collective significance.

Thus, the CiptaSTEAM learning model not only facilitates the creation of art but also encourages students to apply transdisciplinary knowledge in their creative processes. This aligns with the values of Indonesian local wisdom, which emphasises the interconnectedness of knowledge, emotion, and intention in creating works that are meaningful and beneficial to society. By integrating STEAM with the essence of "Cipta," the model fosters an environment where students are encouraged to innovate while considering the broader implications of their creations in the world around them.

Integrative holistic learning with STEAM has proven to enhance students' knowledge and skills. This study aligns with the opinion of Prayitno et al. (2023), which states that drawing activities in visual art demonstrate creativity more effectively when integrated with experience and the courage to express oneself freely. When engaging in art-based activities, each student develops an appreciation for the knowledge they have gained, and when it is based on STEAM, it can foster increased creativity. Students are free to express themselves, but they may not realise that they are also acquiring additional knowledge, which makes them enjoy the learning process more, not merely as an obligation to submit

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assignments.

The activities presented through an observing sequence encourage students to delve into the purpose of the product they will develop. Then, when analysing, students can prepare ideas and imagination by analysing the teacher's explanation. The activity of sketching, which students rarely do, teaches the importance of designing something before creating it, visually speaking about their abstract ideas and imagination, ensuring that the product has a strong foundation. Guerrero et al. (2018) agree that before engaging in art activities such as drawing, students need to analyse the targeted activities to improve their skills. The activity of determining media shows that students are now confident in expressing their ideas, so they no longer hesitate when testing their work with others to receive various feedback. The evaluation activity further boosts students' enthusiasm, as their work becomes more refined and worthy of being presented to a broader audience. This integrative, holistic learning model effectively challenges students to participate in school activities, and their skills continue to improve.

STEAM, practice-based learning, and project-based learning are concepts that closely align with the natural conditions and needs of education, especially art education. These concepts facilitate a synergistic and simultaneous interaction between knowledge and skill competencies (Marín-Marín et al., 2021; Perignat & Katz-Buonincontro, 2018). The development of a STEAM-integrated learning model can optimise children's creativity and abilities. Third-grade elementary school students (semester 1) can learn mathematics by counting fish fins, study science by analysing the structure of fish, perform simple engineering by creating fish from paper and straws, and sharpen their art skills by decorating the fish. This fish-making activity aligns with the opinion of Deans & Wright (2021), who state that STEAM-based learning can enhance children's creativity and their desire to investigate things more deeply. Children become more confident in expressing themselves through art, and their skills in science and mathematics improve due to the engaging nature of the activities.

STEAM-based learning generally stimulates curiosity and higher-order thinking skills, as it involves children in thinking critically while creating a work (Novitasari, 2022). This view is consistent with the findings of this study, which shows that third-grade students became more focused and diligent in creating art, resulting in more varied and creative artworks or designs compared to before using the STEAM approach. At the beginning of implementing the STEAM approach, the children faced difficulties; however, with the development of the CiptaSTEAM learning model, students' skills improved significantly.

The learning model that integrates STEAM in elementary school students emphasises the artistic component as part of a transdisciplinary approach, without making students bored, which in turn makes them more enthusiastic during lessons (Mansyur et al., 2024). The syntax of the learning model, developed through observing, analysing, sketching designs, determining media, testing designs, revising products, presenting, and evaluating, has emerged as a research finding that can be applied in education for elementary school children, or possibly to a broader audience.

CONCLUSION

This study demonstrates the development and effectiveness of the CiptaSTEAM learning model, which integrates a holistic approach to enhance both knowledge and skill competencies in a learning environment. The CiptaSTEAM model was proven to foster creativity and innovative thinking among students by facilitating the simultaneous development of cognitive and practical skills. By incorporating STEAM principles, the model enables a transdisciplinary approach to art education, enriching students' learning experiences and expanding their understanding of how various fields of knowledge intersect.

The CiptaSTEAM model provides valuable implications for both educators and curriculum developers. First, it emphasises the need to bridge the gap between knowledge and skills in the classroom, particularly in art education, where creativity and practical skills are often seen as separate entities. By integrating these aspects, the model promotes a more cohesive learning experience that prepares students for the challenges of the 21st century. For teachers, this model provides a flexible framework for integrating STEAM concepts in ways that are both engaging and relevant to students' everyday lives. The model also aligns with the shifting demands of the Merdeka Curriculum, which encourages more holistic learning outcomes.

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Based on the findings of this research, it is recommended that the CiptaSTEAM model be further tested and refined across different educational levels, particularly in secondary education, to assess its scalability and adaptability. Additionally, professional development for teachers should be prioritised to ensure effective implementation of the model. This includes training teachers in integrating STEAM components within their curriculum and providing them with the necessary tools and resources. Future research could explore the long-term impact of the CiptaSTEAM model on students' academic performance and creative skills, as well as its potential for integration into other subject areas beyond STEAM.

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