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Innovation in Digital Literacy Media for Early Childhood Based on Microsoft Paint

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ABSTRACT: *This study aims to develop an early childhood digital literacy media innovation based on Microsoft Paint called PAINT-EARLY. The study was motivated by a gap between teachers' conceptual understanding of digital literacy and their practical ability to integrate technology into early childhood learning. A qualitative approach with case study and phenomenological orientation was used to explore teachers' experiences, perceptions, and meanings. Participants consisted of 23 early childhood teachers selected purposively; 22 participants provided complete responses. Data were collected through open questionnaires, semi-structured interviews, participatory observation, and document analysis. The findings show that most teachers understood digital literacy appropriately, but practical barriers remained, including teacher digital literacy, limited computer facilities, children's difficulty controlling the mouse, and perceptions that Paint could be complicated. PAINT-EARLY is designed as a structured, child-friendly, affordable, and accessible learning medium integrating digital literacy, fine-motor stimulation, and creative expression. The innovation emphasizes gradual instruction, simple tools, guided drawing activities, and teacher assistance. The study positions PAINT-EARLY as a practical innovation that requires further classroom trials to examine its implementation and developmental outcomes.*

KEYWORDS *— early childhood, digital literacy, Microsoft Paint, PAINT-EARLY, learning media*

I. INTRODUCTION

Digital technology has become an increasingly visible part of children's everyday environments and has influenced educational practices, including early childhood education. Children aged 0–6 years encounter digital devices in family, school, and community contexts. Consequently, digital literacy needs to be introduced from an early age through activities that are meaningful, safe, developmentally appropriate, and accompanied by adults.

In early childhood education, digital literacy should not be reduced to the ability to operate a computer. It includes the ability to use digital tools purposefully, creatively, responsibly, and appropriately. Tatminingsih reported that digital literacy in Indonesian early childhood education can be implemented in a limited and guided manner, with involvement from teachers and parents and adequate supervision [2]. This finding indicates that the availability of technology alone is insufficient; pedagogical planning and adult guidance are also required.

Previous research has demonstrated the relevance of computer-based learning for young children. Shofa found that Computer Kids learning at an inclusive PAUD introduced children to computer hardware and age-appropriate software, including Microsoft Paint and Microsoft Word. Through these activities, children learned to recognize shapes, letters, and numbers while developing the ability to use digital media appropriately [1]. This study provides a direct basis for considering Microsoft Paint as an accessible learning medium for early childhood.

Nevertheless, a gap remains between the availability of simple software and its systematic use as a learning medium. The present manuscript identifies several practical challenges reported by teachers. Many teachers had not used Microsoft Paint with children, while others had used it only occasionally. Teachers also reported challenges related to children's mouse control, lack of facilities, and perceptions that Paint was difficult.

These conditions create a need for an innovation that does not require complex software or expensive infrastructure but can provide structured learning experiences. PAINT-EARLY was therefore designed as a Microsoft Paint-based digital literacy medium that integrates three dimensions: digital literacy, fine-motor stimulation, and creative expression.

The research questions are: (1) How do early childhood teachers understand digital literacy in the context of early childhood learning? (2) How do teachers experience the integration of digital technology, particularly Microsoft Paint? (3) What barriers and challenges do teachers encounter? and (4) How do teachers perceive the potential of a Microsoft Paint-based digital literacy media innovation?

The purpose of this study is to understand teachers' meanings and experiences, identify barriers to digital technology integration, and formulate the design principles of PAINT-EARLY as a practical innovation for early childhood education.

II. LITERATURE REVIEW

2.1 Digital Literacy in Early Childhood Education

Digital literacy refers to the interests, attitudes, abilities, and skills required to use digital technologies to access, manage, integrate, analyze, and evaluate information and to communicate effectively [2]. In early childhood education, this concept must be adapted to children's developmental characteristics. Digital literacy should be introduced through concrete experiences, play, exploration, creativity, and adult guidance rather than through abstract instruction.

Karnita et al. reviewed 33 studies published between 2019 and 2024 and found that children engage with digital technology through multimodal practices for both play and learning. The review discussed links between digital literacy and dimensions of cognitive development such as early numeracy, executive functioning, critical thinking, and creativity [4]. These findings support the view that digital literacy can be broader than technical operation when children are given meaningful opportunities to create and explore.

Liu et al. systematically reviewed 89 empirical studies on digital technologies and young children's language and literacy development. The review covered areas such as print knowledge, alphabet knowledge, phonological awareness, early vocabulary, and narrative skills [3]. This evidence suggests that digital technology can contribute to early learning when its use is pedagogically designed rather than treated as an end in itself.

2.2 Microsoft Paint as a Learning Medium

Microsoft Paint is a simple image-editing and drawing application with basic tools such as pencil, brush, color selection, shapes, and eraser. Its relatively simple interface makes it a potential introductory environment for children who are beginning to learn computer use.

Shofa's study is particularly relevant because Microsoft Paint was explicitly included among the software introduced in Computer Kids learning for young children [1]. Children used the software to recognize shapes, letters, and numbers. This indicates that Paint can be embedded in early childhood learning when teachers provide age-appropriate guidance.

In PAINT-EARLY, Microsoft Paint is not positioned merely as software to be mastered. It is used as a medium through which children practice basic computer interaction, make visual choices, create simple drawings, and save their work. Thus, the learning focus is placed on the process of exploration and expression rather than on technical mastery.

2.3 Fine-Motor Stimulation and Creative Expression

Digital drawing requires coordination between visual attention and hand movement. When children move a mouse, click, drag, select colors, and draw lines, they engage in activities that require hand-eye coordination. Such activities should be introduced gradually because children's fine-motor abilities are still developing.

Creative expression is also central to the proposed medium. Children can choose colors, shapes, and drawing subjects and can revise their work. The purpose is not to require identical products but to provide opportunities for children to make choices and express ideas. In this sense, the digital environment functions as a creative space rather than simply a technical exercise.

2.4 Innovation of Microsoft Paint-Based Digital Literacy Media

PAINT-EARLY is conceptualized as a structured, gradual, child-friendly, affordable, and flexible learning medium. It combines basic digital skills with drawing and creative activities. The innovation is designed to respond to the practical needs identified by teachers rather than adding technological complexity.

The design principles include: (1) gradual introduction of tools; (2) short and clear instructions; (3) child-friendly visual tasks; (4) integration of digital and physical activities; (5) teacher scaffolding; (6) opportunities for creative choice; and (7) simple procedures for saving and documenting children's work.

2.5 Social Constructivist Perspective

The innovation is informed by a social constructivist perspective in which children's learning develops through interaction, language, culture, and guidance from more capable others. In practice, the teacher demonstrates a task, provides prompts, observes children's responses, and gradually reduces assistance as children become more capable.

This perspective is particularly relevant because young children may not independently understand the sequence of operating a computer application. Teacher scaffolding therefore becomes part of the learning design rather than an additional activity.

2.6 Research Gap and Position of the Study

Existing studies establish the relevance of digital literacy in early childhood and provide evidence that computer-based learning can introduce children to software such as Microsoft Paint [1], [2]. Systematic reviews also indicate that digital technologies can support various dimensions of young children's learning [3], [4]. However, the present study focuses on transforming Microsoft Paint into a structured early childhood digital literacy medium that explicitly integrates digital skills, fine-motor practice, and creative expression.

The novelty of PAINT-EARLY therefore lies not in inventing new drawing software, but in designing a pedagogical framework around a simple and accessible application. The innovation provides a sequence of activities, teacher guidance, child-friendly tasks, and opportunities for documentation. This positioning responds to teachers' reported need for operational guidance rather than additional abstract theory.

III. METHODOLOGY

This study used a qualitative approach with a case study and phenomenological orientation. The qualitative approach was selected because the study aimed to understand teachers' experiences, perceptions, meanings, and practical challenges in integrating digital literacy into early childhood education.

The participants were 23 early childhood teachers selected purposively. The inclusion criteria were: (1) active early childhood teachers, (2) at least one year of teaching experience, and (3) willingness to participate. Of the 23 participants, 22 provided complete responses.

Data collection involved an open questionnaire, semi-structured interviews, participatory observation, and document analysis. The documents included lesson plans, teacher notes, and children's work artifacts. The questionnaire was used to capture teachers' perceptions and practical experiences concerning digital literacy and Microsoft Paint.

The researcher served as the main instrument and was supported by interview guidelines, observation sheets, and document-analysis guidelines. Data analysis followed an interactive process involving data condensation, data display, and conclusion drawing and verification [7]. Thematic analysis was used to identify recurring themes.

Data trustworthiness was supported through source triangulation, technique triangulation, member checking, and an audit trail. Ethical considerations included informed consent, confidentiality, voluntary participation, the right to withdraw, and secure data storage.

Because the study is primarily qualitative and exploratory, the percentages reported below are descriptive summaries of the 22 complete responses and are used to support interpretation rather than to make statistical generalizations.

IV. RESULTS AND DISCUSSION

4.1 Teachers' Understanding of Digital Literacy

Twenty-one of the 22 complete respondents (95.5%) defined digital literacy as the ability to use digital technology creatively, responsibly, and meaningfully according to children's developmental stage. One respondent (4.5%) defined it more narrowly as the ability to read and write using a computer. This finding

indicates that most respondents had an appropriate conceptual understanding of digital literacy, although conceptual understanding does not automatically guarantee practical implementation.

The finding is consistent with the broader understanding of digital literacy presented by Tatminingsih [2], in which digital literacy includes more than technical operation. It also aligns with recent systematic evidence that digital literacy can intersect with broader developmental and cognitive dimensions [4].

4.2 Teachers' Experience with Microsoft Paint

Seventeen of the 22 complete respondents (77.3%) had never used Microsoft Paint with their pupils, while five (22.7%) had used it but only occasionally. This result identifies a clear implementation gap: Microsoft Paint is a relatively simple application, yet it has not been systematically incorporated into the learning experiences of many participating teachers.

This finding is important in relation to Shofa's study [1], which demonstrated that Microsoft Paint could be introduced in Computer Kids learning for young children. The difference is that PAINT-EARLY attempts to provide a structured framework that helps teachers move from awareness of the software to planned classroom use.

4.3 Barriers to Digital Technology Integration

The most frequently identified problem was low teacher digital literacy, reported by 19 of 22 respondents (86.4%). Two respondents (9.1%) identified the absence of computers at school, and one respondent (4.5%) identified the large number of paid applications as a barrier. These responses show that technology integration is influenced by teacher readiness, infrastructure, and perceived cost.

The findings support the rationale for using a simple and accessible application. Rather than introducing sophisticated software, PAINT-EARLY uses a familiar basic drawing environment and focuses on clear operational steps.

4.4 Children's Challenges When Using Paint

Ten respondents (45.5%) reported that children had difficulty controlling the mouse because their motor skills were still developing. Six respondents (27.3%) identified lack of facilities, while another six (27.3%) considered Paint too complicated. These results indicate that the medium must be designed around children's developmental readiness.

Accordingly, PAINT-EARLY uses a gradual sequence: first introducing the mouse and basic tools, then simple lines and shapes, followed by coloring and thematic drawing. The objective is to provide repeated practice without making the activity excessively demanding.

4.5 Teachers' Perceptions of the Innovation

Twenty of 22 respondents (90.9%) identified opening Microsoft Paint and introducing basic tools as the appropriate first step. All 22 respondents (100%) agreed that when children lose focus, the session should be interrupted and combined with physical activity or singing. Twenty-one respondents (95.5%) also identified helping children save files with clear names as an appropriate follow-up activity.

These findings suggest that the innovation should not be designed as a continuous screen-based session. Instead, it should alternate between short digital activities and active classroom experiences. This approach is consistent with the developmental nature of early childhood learning and with the need for adult guidance emphasized in digital literacy research [2].

4.6 Perceived Main Advantage of PAINT-EARLY

All 22 respondents (100%) identified the use of Microsoft Paint as free and easy to use as the main advantage of the proposed innovation. Affordability is therefore not merely a technical feature; it is part of the adoption context. A medium that does not require additional paid software may be more practical for schools with limited budgets.

At the same time, affordability should not be equated with effectiveness. The current study has not conducted a classroom trial to establish developmental outcomes. The findings therefore support the feasibility and perceived usefulness of the innovation, while evidence of effectiveness remains a topic for subsequent research.

4.7 Design Implications for PAINT-EARLY

First, the medium should be structured and gradual. Children need to become familiar with the mouse, interface, and basic tools before undertaking more complex drawing tasks.

Second, the medium should remain child-friendly. Instructions should be brief, visual, and supported by teacher demonstrations.

Third, the medium should be affordable and accessible. The design should minimize dependence on paid applications or internet connectivity.

Fourth, activities should support fine-motor development through repeated but manageable mouse-control tasks.

Fifth, the medium should remain flexible. Teachers should be able to insert songs, movement, or other play activities whenever children lose focus.

Sixth, the medium should support reflection and documentation. Saving children's work with clear file names can become a simple digital literacy practice while also creating an archive of children's learning.

4.8 Proposed PAINT-EARLY Learning Sequence

The proposed learning sequence consists of six progressive stages:

Stage 1 — Introduction to the computer: recognizing the monitor, mouse, keyboard, and basic computer functions.

Stage 2 — Mouse practice: moving the pointer, clicking, and dragging through simple playful tasks.

Stage 3 — Introduction to Paint: opening the application and recognizing pencil, brush, colors, shapes, and eraser.

Stage 4 — Basic drawing: creating dots, lines, circles, squares, and simple combinations of shapes.

Stage 5 — Thematic creative drawing: producing simple pictures based on familiar themes such as family, food, animals, plants, or the child's surroundings.

Stage 6 — Saving and sharing: saving the work using a clear file name, showing the work to peers, and reflecting briefly on the process.

V. CONCLUSION

This study indicates that Microsoft Paint has potential to be developed as an early childhood digital literacy medium when it is embedded in a structured pedagogical design. Most participating teachers demonstrated an appropriate conceptual understanding of digital literacy, but practical implementation remained limited. The main barriers identified were teacher digital literacy, facility limitations, children's difficulty controlling the mouse, and perceptions of software complexity.

PAINT-EARLY responds to these conditions by combining digital literacy, fine-motor stimulation, and creative expression through gradual and child-friendly Microsoft Paint activities. Its main practical advantages are simplicity, affordability, and accessibility. The proposed design also emphasizes short digital sessions, teacher scaffolding, physical activities, and documentation of children's work.

The main limitation of this study is that the innovation has not yet been tested through a full classroom trial. Therefore, the findings should be interpreted as exploratory evidence concerning teachers' perceptions, needs, and design requirements rather than proof of effectiveness. Future research should conduct classroom trials involving children aged 5–6 years, examine usability and learning processes, and evaluate changes in digital literacy, fine-motor coordination, and creative expression over time.

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REFERENCES

[1] M. F. Shofa, "Pengembangan Literacy Digital Anak Usia Dini Melalui Pembelajaran Computer Kids," Early Childhood Research Journal (ECRJ), vol. 6, no. 2, pp. 101–110, 2023, doi: 10.23917/ecrj.v6i2.23331.

[2] S. Tatminingsih, "Implementation of Digital Literacy in Indonesia Early Childhood Education," International Journal of Emerging Issues in Early Childhood Education, vol. 4, no. 1, pp. 12–22, 2022, doi: 10.31098/ijeiece.v4i1.894.

[3] S. Liu, B. L. Reynolds, N. Thomas, and A. Soyoof, "The Use of Digital Technologies to Develop Young Children's Language and Literacy Skills: A Systematic Review," SAGE Open, vol. 14, no. 1, pp. 1–18, 2024, doi: 10.1177/21582440241230850.

[4] A. Karnita, S. Aisyah, N. Mustapa, E. S. Syarah, D. R. Jovanka, and S. bt Mahamud, "Exploring the Impact of Digital Literacy on Cognitive Development in Early Childhood Education: A Systematic Literature Review," Al-Athfal: Jurnal Pendidikan Anak, vol. 11, no. 1, pp. 105–134, 2025, doi: 10.14421/al-athfal.2025.111-08.

[5] L. S. Vygotsky, Mind in Society: The Development of Higher Psychological Processes. Cambridge, MA: Harvard University Press, 1978.

[6] J. W. Creswell and C. N. Poth, Qualitative Inquiry and Research Design: Choosing Among Five Approaches, 4th ed. Thousand Oaks, CA: Sage, 2018.

[7] M. B. Miles, A. M. Huberman, and J. Saldaña, Qualitative Data Analysis: A Methods Sourcebook, 4th ed. Thousand Oaks, CA: Sage, 2020.