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Exploring Teachers' and Students' Perspectives on the Utilization of Interactive Flat Panels in Deep Learning Approaches

Selly Wahyuning Tyas, Muhammad Arifuddin, Mastur, & Hamsi Mansur
Lambung Mangkurat University, South Borneo, Indonesia
*Correspondence: *selly.wt@rumahbelajar.id, arifuddin_pfis@ulm.ac.id, mastur@ulm.ac.id, hamsi.mansur@ulm.ac.id.

ABSTRACT

The latest policy from the Ministry of Primary and Secondary Education (Kemendikdasmen) promotes school digital transformation and the implementation of deep learning approaches, necessitating the use of devices such as Interactive Flat Panels (IFPs) in classrooms. Although IFPs are considered capable of enhancing interactivity, collaboration, and student engagement, their practical utilization in schools remains varied and not fully understood from the perspectives of teachers and students. This article aims to describe how teachers and students perceive and experience the benefits of utilizing Interactive Flat Panels (IFPs) in implementing deep learning approaches in the classroom. The method employed combines qualitative interviews with teachers and students and quantitative surveys to gather a comprehensive understanding of the subject. This methodology involves teachers and students from elementary schools. Survey analysis reveals that 81.0% of teachers already utilize Interactive Flat Panels (IFPs) in implementing deep learning approaches in the classroom, while 94.0% of students perceive benefits from such learning. In conclusion, Interactive Flat Panels (IFPs) hold strong potential to support deep learning when backed by student-centered lesson designs, adequate teacher technological literacy, and consistent school-level policy and infrastructure support. Overall, this article contributes by providing an empirical and detailed overview of how teachers and students interpret IFP usage in the context of education digitalization policies, while

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offering practical implications for leveraging IFPs in deep learning at schools.

A B S T R A K

Kebijakan terbaru Kemendikdasmen yang mendorong transformasi digital sekolah dan implementasi pembelajaran mendalam menuntut pemanfaatan perangkat seperti Interactive Flat Panel (IFP) di kelas. Meskipun IFP dianggap mampu meningkatkan interaktivitas, kolaborasi, dan keterlibatan siswa, praktik pemanfaatannya di sekolah masih beragam dan belum sepenuhnya dipahami dari sudut pandang guru maupun siswa. Artikel ini bertujuan untuk mendeskripsikan bagaimana guru dan siswa memaknai dan merasakan manfaat, dalam pemanfaatan Interactive Flat Panel (IFP) pada penerapan pendekatan pembelajaran mendalam di kelas. Metode yang digunakan adalah menggabungkan wawancara kualitatif dengan guru dan siswa serta survei kuantitatif untuk mengumpulkan pemahaman yang komprehensif tentang subjek tersebut. Metodologi ini mencakup guru dan siswa di Sekolah Dasar. Berdasarkan analisis hasil survei didapatkan bahwa sebanyak 81.0% guru sudah memanfaatkan Interactive Flat Panel (IFP) pada penerapan pendekatan pembelajaran mendalam di kelas dan 94.0% siswa merasakan manfaat dari pembelajaran tersebut. Sebagai simpulan, Interactive Flat Panel (IFP) berpotensi kuat mendukung pembelajaran mendalam ketika didukung oleh desain pembelajaran yang berpusat pada siswa, literasi teknologi guru yang memadai, dukungan kebijakan dan infrastruktur yang konsisten di tingkat sekolah. Secara keseluruhan, artikel ini berkontribusi dengan memberikan gambaran empiris dan terperinci tentang bagaimana guru dan siswa memaknai penggunaan IFP dalam konteks kebijakan digitalisasi pendidikan, sekaligus menawarkan implikasi praktis bagi pemanfaatan IFP untuk pembelajaran mendalam (deep learning) di sekolah.

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1. INTRODUCTION

Digital transformation in schools encourages the use of interactive presentation technologies such as Interactive Flat Panels, which replace traditional whiteboards and projectors in various countries, including Indonesia. IFPD is a new and renewable technology that integrates current technology into the world of education, indirectly supporting the sustainability of today's world. IFPD proves that an educator in learning no longer needs chalk derived from natural rocks or markers made of plastic for writing tools, whiteboards made of wood for writing media, and even lots of paper to share a material. (Yuda Septian Kurniawan, 2024).

Various reports and studies have shown that Interactive Flat Panels (IFPs) can increase student engagement, encourage collaboration, and provide learning resources that support the understanding of complex concepts. IFPs are a solution for creating a more collaborative and engaging learning experience. They enable teachers to present material in a more interactive way, using large visual displays and interactive features that facilitate the delivery of information during the teaching and learning process. (Rachman Riyadi, 2024).

National policies regarding the digitalization of learning and the provision of Interactive Flat Panels (IFPs) in schools reinforce the push for teachers to utilize these devices to improve the quality of the learning process. Presidential Instruction (Inpres) Number 7 of 2025 stipulates that, in order to encourage improvements in the quality and competitiveness of Indonesian human resources through accelerated programs, one of which is the digitalization of learning. The Indonesian President has a program to distribute IFPs to all schools in Indonesia.

Minister of Primary and Secondary Education Regulation No. 13 of 2025 concerning the latest Curriculum. This regulation outlines the basic curriculum framework, which incorporates a deep learning approach. The student-centered learning paradigm and IFP are often viewed as tools that can facilitate more interactive and collaborative learning activities that support the deep learning approach.

The integration of the Merdeka Curriculum and the 2013 Curriculum with the deep learning approach demonstrates the potential for synergy in improving the quality of education in Indonesia. The Merdeka Curriculum, which emphasizes freedom to fulfill learning needs and develop student character, aligns with the principles of deep learning, which focus on in-depth and meaningful learning. (Ambar Wulan Sari, 2025). In the definition of educational technology, promoting deep learning for students is considered an important goal of educational technology. (Danni Zhao, 2022).

Interactive Flat Panels (IFPs) have been distributed to several schools in Indonesia, including Banjarbaru City, South Kalimantan Province. However, it remains unclear how teachers are utilizing the IFPs in collaborative learning with students, and whether they are meeting the government's expectations.

It's still unknown how teachers utilize IFP, or how to operate it optimally. Utilizing IFP in implementing deep learning approaches with students in the classroom is also crucial.

The deep learning approach focuses on meaningful, conscious, and enjoyable learning. Implementing deep learning in education can support a more meaningful learning approach. Students not only memorize information but also deeply understand concepts and are able to apply them in real-world situations. However, the implementation of deep learning in education is not without challenges, such as limited

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technological infrastructure and teachers' lack of understanding and skills in using technology and related deep learning concepts. (Ambar Wulan Sari, 2025).

Teacher and student responses to in-depth learning using IFP are unknown. Assessing student perceptions of the use of IFP in in-depth learning is crucial because it allows us to understand their responses to the learning, which often determines success or failure. (Hafrizal, 2021). So that we can further plan the follow-up actions that will be carried out in the future.

Research on the digitalization of learning through the use of IFP and deep learning approaches is crucial for evaluating the effectiveness of government policies in education. By understanding the effectiveness of digitalization and deep learning, governments, through their policies, and teachers implementing classroom instruction can adapt strategies to make learning more relevant and beneficial for students.

The author's proposed solution is to conduct research on "Exploring Teacher and Student Perspectives on the Use of Interactive Flat Panels (IFPs) in a Deep Learning Approach." The research results are expected to form the basis for developing more effective learning policies and practices in the future.

This study aims to describe the significance of using Interactive Flat Panels (IFPs) in a deep learning approach for teachers and students. It also reveals teachers' understanding of the deep learning process. Furthermore, this study assesses teachers' and students' experiences using IFPs in the classroom.

The uniqueness of this research is that it presents an evaluation of the implementation of the digitalization policy for learning through the use of Interactive Flat Panel (IFP) to support deep learning, by integrating qualitative and quantitative findings from elementary school teachers and students in Indonesia.

2. METHOD

The research used qualitative interviews with teachers and students. Additionally, a quantitative survey was conducted to support the research data. Qualitative data is often defined as data that provides characteristics and approximates character. Qualitative data has characteristics that we can observe and record, but data in qualitative research is non-numerical. Therefore, qualitative data is collected through interviews, observations, similar methods, and focus groups. Qualitative data contained in statistics is sometimes called categorical data, as sentences can be arranged categorically based on the nature of an object and its attributes. (VandeVusse, 2022).

Mikkelsen, Britha in his book Methods for Development Work and Research: A Guide for Practitioners (1995:296) states that there is room to combine quantitative and qualitative methods from various disciplines. Furthermore, Julia Brannen states that quantitative research is usually driven by the researcher's concerns, while qualitative research takes the subject's perspective as its starting point. These emphases can be presented together in one study.

The study population was teachers and students in Banjarbaru City, South Kalimantan Province, Indonesia. Sample selection in qualitative research is crucial because it will affect the validity, generalizability, and interpretation of the research findings. Purposeful sample selection is carried out by deliberately selecting participants or cases with relevant knowledge or experience related to the research objectives. Sample selection methods in qualitative research can vary depending on the research objectives, context, and research design. (M. Fathun Niam, 2024). The sample consisted of teachers from five schools in the area. In addition, the students in the sample were from

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elementary school level at one school. The sample consisted of 100 teachers from the five schools and 100 students from one elementary school.

The research instrument was a survey on the use of Interactive Flat Panels (IFPs) in immersive learning approaches for teachers. Additionally, a survey was conducted to measure student responses to learning using IFPs. The research procedure included structured data collection through both surveys. Reliable data indicates how consistent the data is over a period of time, while objective data involves the consensus of many people. Valid data must be reliable and objective, although reliable data is not necessarily valid, and neither is objective data. (M. Fathun Niam, 2024).

In the context of research, data analysis can be defined as the activity of discussing and understanding data in order to find meaning, interpretation, and conclusions from the entire data set. Data analysis can also be defined as the process of responding to data, organizing, sorting, and processing it into a systematic and meaningful structure. (M. Fathun Niam, 2024).

Data analysis in this study was conducted by combining the results of qualitative interviews and quantitative surveys in an integrated manner. Interview data were analyzed using thematic analysis techniques to identify teachers' and students' perceptions, experiences, and meanings related to the use of IFP in a deep learning approach. Meanwhile, survey data were analyzed using descriptive statistics to describe the general picture of the responses and benefits perceived by respondents. In the context of research, data analysis can be interpreted as the activity of discussing and understanding data in order to find meaning, interpretation, and certain conclusions from the entire data in the study. Data analysis can also be interpreted as the process of responding to data, organizing, sorting, and processing it into a systematic and meaningful structure. (M. Fathun Niam, 2024).

The procedure used is Convergent Parallel Mixed Methods. This research combines quantitative and qualitative methods to achieve a comprehensive goal. Simultaneous data collection, where researchers conducted qualitative interviews and quantitative surveys, aimed to gather a comprehensive understanding of the subject. Interview data was analyzed thematically, while survey data was analyzed using descriptive statistics. The results were then combined in an integrated manner to find meaning, interpretation, and final conclusions. The use of this method aims to offset the weaknesses of one method (limited qualitative reach) by the strengths of the other method (quantitative data). Researchers present frequency statistics along with quotes from respondents' reasons/perspectives to provide a detailed empirical picture.

3. RESULTS AND DISCUSSION

The following are the results of the validity and reliability tests of the survey instrument given to teachers. Where X1 is the level of teacher knowledge regarding Deep Learning and X2 is the level of agreement that the Interactive Flat Panel (IFP) supports learning using a Deep Learning approach.

Table 1. Results of the validity test of teacher instruments

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Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Pengetahuan DL	4.60	.242	.480	.230	.
IFP Mendukung DL	4.07	.349	.480	.230	.

R table of N = 100 = 0.195 (Gullford, JP & Benyamin, F, 1978). The instrument is declared valid if the calculated R is greater than the R table.

R count is greater than R table = 0.480 > 0.195, the instrument is declared valid so that the instrument is a good measuring tool that is used as an instrument with a high level of instrument accuracy in measuring and can measure the right construct.

Table 2. Results of the reliability test of teacher instruments

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.641	.648	2

Cronbach's Alpha 0.641, is in the range of 0.41 - 0.70 (Masidjo, 2010), so the level of consistency of measurement results when the instrument is used repeatedly and produces stable data, the level of reliability is considered sufficient.

The following are the results of the validity and reliability tests of the survey instrument given to students. Where X1 is the students' feelings regarding learning using IFP and X2 is the students' level of understanding that supports learning with the Deep Learning approach.

Table 3. Results of the validity test of student instruments

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Perasaan	4.32	.705	.535	.286	.
Pemahaman	4.32	.543	.535	.286	.

R count is greater than R table = 0.535 > 0.195, the instrument is declared valid so that the instrument is a good measuring tool that is used as an instrument with a high level of instrument accuracy in measuring and can measure the right construct.

Table 4. Results of the reliability test of student instruments

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Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.693	.697	2

Cronbach's Alpha 0.693, is in the range of 0.41 - 0.70 (Masidjo, 2010), so the level of consistency of measurement results when the instrument is used repeatedly and produces stable data, the level of reliability is considered sufficient.

In total, one hundred questionnaires were distributed to the five elementary schools selected for this study (see **Table 5**). All one hundred questionnaires were successfully retrieved. This clearly shows that 100% of the total questionnaires were successfully distributed. **Table 5** shows that there are a total of one hundred teacher respondents. Among these respondents, 81 (81.0%) teachers have used Interactive Flat Panels (IFP) in their learning, while 19 (19.0%) teachers have not used Interactive Flat Panels (IFP) in their learning. This further reveals that many teachers have used IFP in their learning.

Table 5. Frequency of IFP utilization by teachers

Renponses	No.	Percentage (%)
Already utilizing IFP	81	81.0
Not yet utilizing IFP	19	19.0
Total	**100**	**100.0**

The majority of teachers stated that the overall operation of IFP is relatively easy to do. In their view, the use of IFP provides many significant benefits in the learning process in general. In addition, they strongly agree that the use of IFP is very supportive of the implementation of the deep learning approach in the classroom. The reasons they gave were varied, including, students will be happy if learning with IFP, fun learning makes students active and more meaningful, with IFP students can have a more meaningful learning experience, the use of IFP greatly supports in-depth learning especially the subjects they teach, by using IFP students understand the learning more quickly, as a learning medium that makes the class more interactive, provides new experiences for students in learning so that learning becomes more meaningful, can increase student participation in learning by following current technological developments, encourages active student involvement, IFP allows students to write directly on the screen, move objects, answer interactive quizzes, collaborate directly, and the media really makes it easier for teachers, more attractive and fun for students.

Quantitative data shows that the majority of teachers have used IFP. Qualitative integration reveals that ease of operation is the main key, teachers feel that IFP makes it easier for them because they no longer need chalk or a lot of paper, so the teaching process becomes more efficient and enjoyable. Utilizing IFP in learning, then presented in a deep learning approach, this means that most teachers have implemented TPACK, namely Technological Pedagogical Content Knowledge is the effectiveness of delivering lessons with technology integration. This is an ideal application in all aspects of learning, all of which are important in the teaching and learning process. (Santos; De Regla Castro, 2021).

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19% of teachers have not optimally utilized IFP due to various factors, including not understanding how to operate IFP and the absence of scheduling for the use of IFP, which is only available in one school, making some teachers reluctant to use it in learning.

Table 6 The data in the table shows that teachers' understanding of the deep learning approach varied. The percentage of correct answers related to the deep learning framework was 44.0%, followed by the learning experience as a process experienced by students in deep learning at 56.0%. Furthermore, the learning principles, which are characteristics of deep learning, were the highest at 81.0%, and the graduate profile dimensions to be achieved through the implementation of deep learning at 31.0%.

Table 6. Frequency of teachers' understanding of the concept of the deep learning approach

Question Theme	Percentage of Correct Answers (%)
Framework of deep learning	44.0
Learning experience as a process experienced by students in in-depth learning	56.0
Learning principles that are characteristics of deep learning	81.0
Graduate profile dimensions to be achieved in the implementation of in-depth learning	31.0

The expected correct answers related to the concept of the deep learning approach are as follows. The framework of deep learning includes learning partnerships, pedagogical practices, learning environments, and digital utilization. The learning experience is a process experienced by students in deep learning, namely understanding, applying, and reflecting. The learning principles that are characteristic of deep learning are conscious, meaningful, and joyful. The graduate profile dimensions to be achieved in the implementation of deep learning include faith and piety towards God Almighty, citizenship, critical reasoning, creativity, collaboration, independence, health, and communication.

The identification of systemic challenges in the form of low scores on understanding the Deep Learning framework (44.0%) is integrated with a qualitative perspective on the need for consistent policies and training. This integration demonstrates that IFP technology is merely a tool, while its success depends on the pedagogical readiness of teachers.

The conceptual literacy gap, a critical finding, was that teachers' understanding of the graduate profile dimensions in Deep Learning only reached 31.0%. This suggests that, as a population, teachers may be skilled at operating the tools (technical aspects), but still require intensive guidance in integrating them with the deep learning philosophy (pedagogical aspects).

In this case, they also need to apply constructivist learning theory and how to develop constructivist pedagogy, with various effective strategies to improve meaningful learning and critical thinking in the classroom, and can improve academic standards. (Zajda, 2021).

Table 7 The results of a study of one hundred students showed that 29.0% of students answered that they felt happy learning using IFP because it was easier to understand the lesson, 29.0% of learning was more exciting, 15.0% were interactive, the screen could be touched directly, 10.0% learned while playing games with friends, 7.0%

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the screen was wider, videos and images were clearer, while 4.0% liked certain lessons using IFP. In addition, 6.0% of students had not felt the benefits of IFP.

Table 7. The answer theme comes from the student's perspective

Responses	No.	Percentage (%)
Feel happy learning using IFP because it is easier to understand the lessons	29	29.0
Feel happy learning using IFP because learning is more fun	29	29.0
Feel the joy of learning using IFP because it is interactive, the screen can be touched directly	15	15.0
Feel happy learning using IFP because you learn while playing games with friends	10	10.0
Enjoy learning using IFP because the screen is wider, the videos and images are clearer	7	7.0
Feel happy learning using IFP because you like certain lessons using IFP	4	4.0
Have not felt the benefits of IFP	6	6.0
Total	**100**	**100.0**

There was strong integration through data triangulation, where statistical results "spoke" through interview narratives, clarifying the numbers with meaning. Quantitatively, 29.0% of students found the lessons easier to understand. Qualitative data explained why: the IFP screens allowed for larger visuals, clearer videos, and interactive features like quizzes and live collaboration that conventional whiteboards couldn't provide.

There are still 6% of students who do not feel the benefits due to student absence during learning and because some teachers have not utilized IFP in classroom learning.

This study addresses a gap in teachers' use of Interactive Flat Panels (IFPs) in collaborative learning with students in Banjarbaru City, South Kalimantan Province. With the distribution of IFPs across several schools, this study provides a concrete picture of how IFP utilization aligns with government expectations and reveals previously underreported real-world conditions.

The study also revealed teachers' strategies for utilizing IFP, including how easy it is to use and optimize it for deep learning. This information is crucial because previously unknown details about how teachers utilize this technology have not been explored. Therefore, the research findings can inform the development of more effective training and guidelines for IFP use.

Furthermore, this study examines the implementation of a deep learning approach through IFP, as well as the challenges faced by teachers and students in the meaningful learning process. By understanding infrastructure constraints, teachers' understanding, and skills, the research findings can provide concrete recommendations for improving the quality of learning and ensuring that deep learning truly takes place in the classroom.

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Finally, this study reveals teacher and student responses to immersive learning using IFP, which serves as an indicator of the success or failure of implementing new technologies and approaches. By understanding their perceptions, relevant parties can design more appropriate follow-up actions, including training, infrastructure provision, and adapting learning methods to better meet student needs.

4. CONCLUSION

The percentage of IFP utilization shows that 81.0% of teachers have used Interactive Flat Panels (IFP) to implement immersive learning approaches in the classroom, while 94.0% of students have benefited from the learning process. These figures indicate that IFP has been well-accepted and utilized by teachers, and has had a positive impact on students in the teaching and learning process.

Although this study has a limited sample size focused on Banjarbaru City, South Kalimantan, the data provides a strong indication for the Indonesian elementary school teacher and student population that the adoption rate is high. It can be predicted that the government-deployed digital infrastructure has a very good level of acceptance among educators. The positive impact on student engagement, with students experiencing tangible benefits, leads to the conclusion that the use of interactive panels significantly increases motivation and conceptual understanding compared to traditional methods.

The use of IFP has been proven to support the implementation of deep learning in the classroom, as it allows teachers to present material in a more interactive and engaging manner. This technology facilitates meaningful, in-depth learning, and aligns with deep learning principles, such as active conceptual understanding and application in real-world situations.

Student responses to learning using IFP were very positive. 29.0% of students felt it was easier to understand the lessons, 29.0% felt learning was more fun, 15.0% felt it was more interactive because the screen could be touched directly, 10.0% felt they were learning while playing games with friends, 7.0% felt the screen was wider and the display was clearer, 4.0% liked certain lessons that used IFP, and only 6.0% had not felt the benefits of IFP. This shows that most students enjoy and feel the positive impact of using IFP in learning.

This research contributes to a comprehensive understanding of teachers' use of IFP and students' responses to immersive learning, which can inform the development of technology-based learning policies and practices. The results provide a concrete picture of the benefits and challenges of IFP implementation and provide input for future learning improvements and development.

Limitations include the limited sample size of teachers from five schools and students from one school in Banjarbaru City, making it less representative of the national situation. Furthermore, an in-depth analysis of factors influencing IFP utilization, such as teacher skills, infrastructure availability, and school support, has not been conducted.

This research recommends more intensive training for teachers in the use of IFP and the implementation of deep learning approaches. Schools and the government also need to provide adequate infrastructure and support the use of learning technology, as well as continuously monitor and evaluate the impact of IFP use on learning quality.

5. AUTHORS' NOTE

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