

Media in Improving Teachers Professional Competence at SMAN 5 Batam

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Received: June 16, 2025

Revised: August 15, 2025

Accepted: September 25, 2025

Published: September 30, 2025

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DOI: [10.29303/jppipa.v11i9.12180](https://doi.org/10.29303/jppipa.v11i9.12180)

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Abstract: This study aims to analyze the use of digital-based media in enhancing the professional competence of teachers at SMAN 5 Batam. Teacher competence is crucial for improving the quality of learning, and digital technology offers potential strategies for professional development. The research employed a quantitative approach, using descriptive and inferential analyses, with simple linear regression to examine the relationship between digital media use and teacher competence. The results show that integrating digital media positively impacts teachers' knowledge, pedagogical skills, and learning innovation. The study found a strong correlation between digital media use and professional competence ($r = 0.770$) and a coefficient of determination of 58.83%, indicating that digital media contributes significantly to competence improvement. Despite these positive outcomes, several challenges were identified, including limited infrastructure, insufficient ongoing training, and resistance to adopting new technologies. The findings suggest that the effective use of digital media can enhance teacher competence when supported by proper policies, continuous training, and capacity-building programs. This research highlights the strategic role of digital technology in teacher development and provides empirical evidence that supports the integration of digital media as a tool to foster professional growth and innovation in education.

Keywords: Media; SMAN 5 Batam; Teachers professional competence improvement

Introduction

The development of digital technology and its various advanced products has brought significant changes to almost all aspects of life, including education. Innovations in technology-based learning products offer convenience and flexibility, which have great potential to improve the quality of learning. While these innovations provide benefits for both teachers and students, they also pose challenges for educators. Teachers are required to continuously enhance their professional competencies through the effective use of digital media. The use of digital tools such as learning videos, simulations, and e-learning platforms has been

proven effective in supporting the improvement of these competencies (Ridoh et al., 2024).

Digital-based media or interactive multimedia, is an effective tool to create a more interesting, dynamic, and fun learning experience. This technology includes various electronic media such as audio, video, interactive TV, compact disc (CD), and internet which all play an important role in supporting the learning process (Hurqa et al., 2022). The application of technology in education is not only dependent on the availability of devices, but also on the teachers' professional skills. Teachers have an important role in integrating technology into the learning process. According to Junaidi et al. (2023), teachers' professional

How to Cite:

Ermawalis, J, F. Y., Darmansyah, Rayendra, Mirshad, E., & Desky, A. H. A. (2025). Media in Improving Teachers Professional Competence at SMAN 5 Batam. *Jurnal Penelitian Pendidikan IPA*, 11(9), 592–598. <https://doi.org/10.29303/jppipa.v11i9.12180>

abilities include knowledge, skills, and attitudes needed to utilize technology effectively. Law No. 14 of 2005 on Teachers and Lecturers and Permendiknas No. 16 of 2007 emphasize the importance of technology skills as part of teachers' professional competence. Teachers are expected to not only master learning materials, but also be able to use technology to support and improve the quality of teaching (Selamat et al., 2013).

The uniqueness of this study lies in its focus on the utilization of digital media based on chemical literacy as a means to improve teachers' professional competence while simultaneously enriching students' learning experiences. This research emphasizes not merely the use of technology, but how it can enhance learning quality through interactivity, creativity, and active student engagement. Previous studies have shown that digital media not only facilitates access to information but also diversifies teaching methods, for example, through interactive PowerPoint with animations and visuals, as well as applications such as Zoom, Google Classroom, and WhatsApp Group (Alfin, 2020; Zega et al., 2025).

The importance of this research is further reinforced by government initiatives to promote technology use in education. According to the latest data from the Ministry of Education, Culture, Research, and Technology (Kemendikbudristek) in October 2024, the Merdeka Mengajar (PMM) Platform has over 4.3 million active users, showing a sevenfold increase compared to 2019. Of these, 52% are located in rural areas, indicating

significant technological penetration across regions. In addition, more than 1.3 million teaching materials have been uploaded by teachers to the platform. Other initiatives, such as Rapor Pendidikan, have assisted over 80% of school principals in planning school improvement programs by leveraging data to enhance education quality (Fahrudin & Pamungkas, 2022).

Specifically, Riau Islands Province exhibits a high level of digital adoption. By 2021, approximately 95% of high schools (SMA/SMK) in the province had internet access (Purba et al., 2023). According to the Indonesian Digital Community Index 2024, Riau Islands ranks ninth out of 38 provinces in Indonesia. These conditions indicate that the educational environment in this region is well-prepared for implementing digital media as a tool to improve teachers' professional competence and students' learning quality (Ismiyanti & Afandi, 2022; Asnur et al., 2025).

Therefore, this study is important as it provides empirical evidence on the effectiveness of chemical literacy-based digital media in enhancing teachers' professional competencies while enriching students' learning experiences. The uniqueness of this research lies in its focus on integrating technology with chemical literacy, distinguishing it from previous studies that primarily examined general digital media usage. It is expected to contribute significantly to the development of learning quality in secondary schools, particularly in regions with high levels of digital penetration such as Riau Islands (Banda & Tola, 2020).

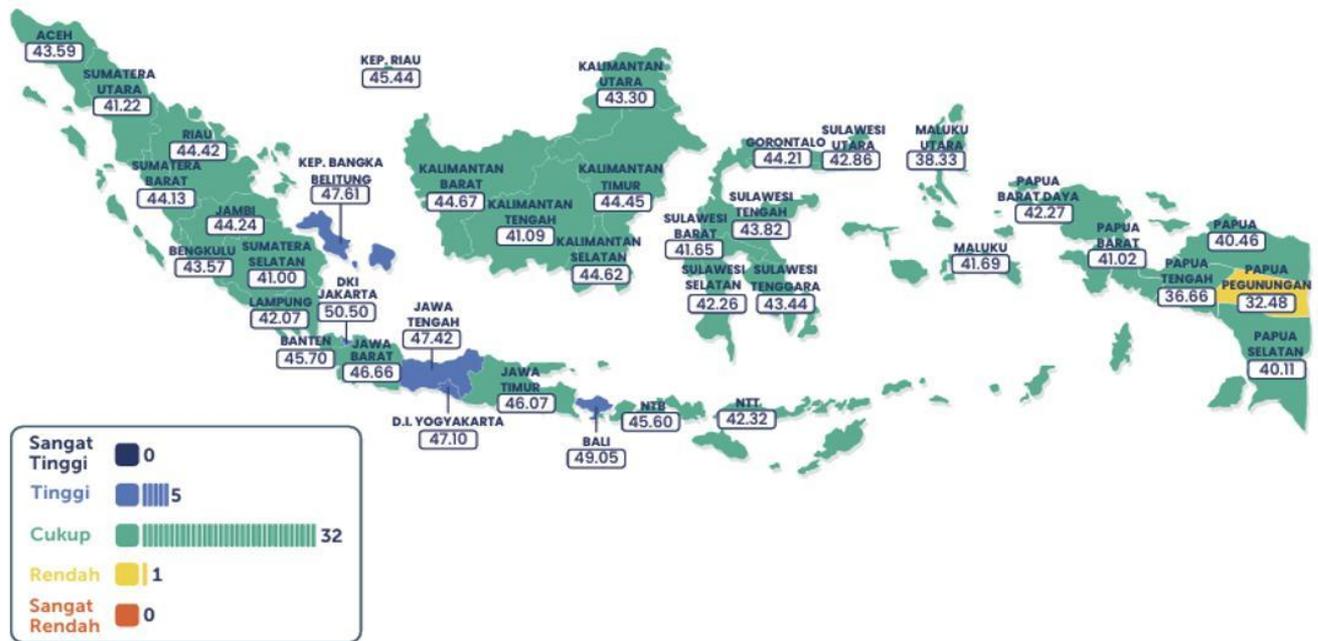


Figure 1. Distribution of IMDI values by province

In the picture, DKI Jakarta is at the top with a percentage of 50.50%, Furthermore, the top 10 rankings in a row can be seen in Table 1.

Not only that, in order to support the school digitization program, the Riau Islands Government, in this case the Education Office, in November 2024 launched a new website "Technology Information and Communication Education (BTIKP) Riau Islands Province. This website is a strategic step to increase the openness of information and facilitate community access, especially in the education sector. This website is present as a form of the government's commitment of Riau Islands province to provide wider access to information for the people of Riau Islands, especially in the field of education (Hanifah et al., 2025).

Table 1. Physics midterm exam scores for the odd semester of the 2024/2025 academic year SMAN 4 Batam

Rankings	Province	Percentage Usage (%)	Category
1	DKI Jakarta	50.50	Very high
2	Bali	49.05	Very high
3	Kepulauan Bangka Belitung	47.61	Very high
4	Jawa Tengah	47.61	Very high
5	DI Yogyakarta	47.10	Very high
6	Jawa Barat	46.66	Very high
7	Banten	45.71	Very high
8	NTB	45.60	Very high
9	Kepulauan Riau	45.44	Very high
10	Kalimantan Barat	44.67	Very high

This is also the case with Teacher Professional Skills. Teacher Certification is a process of providing educator certificates to teachers who have met professional standards as educators or the eligibility of a teacher in Teaching and Learning Activities at school. Professional teachers are an absolute requirement for creating a quality education system and practice (Banda & Tola, 2020). An educator certificate is given if a teacher has met the requirements for academic qualifications, is physically and mentally healthy, and has the ability to realize national education goals. The Government Agency Performance Accountability Report (LAKIP) of the Riau Islands provincial Education Office, which is recorded in the main data of the Education Office in 2024, provides data on the status of educator certification in the Education Office as shown in Table 2.

Table 2 illustrates that of the 5,063 educators spread across each education unit in the Riau Islands, only 2,550 have been certified, this is equivalent to 50.37% and the remaining 2,513 or equivalent to 49.63% have not been certified. This shows that the level of professionalism of Secondary and Vocational Education teachers in the province of Riau Islands is still relatively low, only touching the 50% mark. An educator certificate is authentic evidence that states the professionalism of a teacher. In the Government Agency Performance Accountability Report 2024 of the Riau Islands Provincial Education Office it is stated that one of the strategic issues that is a priority of Education Development for the next five years is "The low professionalism of educators, this is reflected in the low ownership of teacher certification in education units" (Mariani et al., 2025; Banda & Tola, 2020).

Table 2. Number of educators based on certification status

Regency/City	Education Office					
	SMAN		SMKN		PK	
	Status Certification Already	Not yet	Status Certification Already	Not yet	Status Certification Already	Not yet
Batam	568	607	379	409	11	16
Tanjung pinang	191	158	202	137	22	29
Bintan	189	110	111	98	10	10
Karimun	269	196	106	113	17	20
Natuna	156	201	47	61	2	7
Lingga	158	166	35	32	1	13
Anambas	52	69	24	54	0	5
Kepulauan Riau	1583	1507	904	904	63	100

The Performance Report of the Education Office of Riau Islands Province is strengthened by the contents of a copy of Regulation of the Director General of Teachers and Education Personnel Number 2953/B/Pr.00.02/2022 Regarding the Amendment to the Regulation of the Director General of Teachers and Education Personnel Number 3928/B/Hk/2020 Regarding the

Strategic Plan of the Directorate General of Teachers and Education Personnel Year 2020-2024 in point C, it is stated that a number of problems and challenges in fostering teachers and education personnel that need attention in the next 5 years, One of them is that teacher professional development still needs to be optimized, this can be seen from the data on the results of the

Teacher Competency Test (UKG) which also shows that around 75% (seventy-five percent) of districts/cities, most of which are located in outside the island of Java, have an average UKG score below the minimum competency standard (Pratomo et al., 2025).

Educators or teachers of SMAN 5 Batam from 85 educators until February 2025 recorded 52 educators already have teaching certificates or equivalent to 61.18%, and 33 people or equivalent to 38.82% others do not have teaching certificates. The complete data can be seen in Table 3.

Table 3. Number of educators based on certification status

Aspect	Educators			Educational Personnel				
	Employment Status			Certificate		Employment Status		
	PNS	PPPK	Honor	Already	Not yet	PNS	PPPK	Honor
Number	33	37	15	52	33	2		15
Percentage (%)	39.53	43.02	17.44	61.18	38.82	11.76	0	88.24
Total	85			85				

From this data it can be seen that when compared to the data from the Education Office of Riau Islands Province, SMAN 5 Batam shows a relatively higher rate, approximately 11%. And if compared with the national condition, then SMAN 5 Batam has a level that is far above the national average. In terms of supporting facilities for digital-based learning at SMAN 5 Batam, it is also adequate. Internal school data on this condition can be seen by the availability of tools or digital resources that can be utilized by educators and also students, among others: in each classroom there is a projector and its equipment, there is a wifi network available but it has not reached the entire school area, there is a multimedia room that is equipped with its supporting devices, and the availability of several computers or laptops that can be utilized by teachers and school community although it is not sufficient. However, these equipment are not permanently installed in each class, in order to maintain the safety of these equipment (Rahmah et al., 2025; Taali et al., 2024).

The results of interviews conducted by the researcher to 5 teachers of SMA Negeri 5 Batam related to the intensity of digital media utilization in the learning process found that the use of digital media in the learning process showed significant variations. The teachers revealed that the utilization of digital media in their classes is relatively limited. The teacher called only IY stated that the utilization of digital media is only about 40%, with digital media being used mainly to explain material that is abstract. However, although this media is helpful, teachers still feel the need to re-explain the material because students have less interaction with digital media. SL teachers also mentioned that digital media utilization only reached 10%, with the main obstacles being the long preparation time and limited facilities, such as the prohibition of bringing mobile phones to school. SL teachers also feel more comfortable using conventional teaching methods due to the limited time available and the dense curriculum material. Meanwhile, teacher JD revealed that digital media is

almost never used in learning, according to him, the use of digital media is ineffective, a lot of time is wasted, plus the lack of supporting facilities such as the availability of laptops or cellphones and systems that are not yet adequate (Misrofiningah et al., 2025).

Teacher IK revealed that he utilizes digital media more intensively, with usage reaching 60-70%. Digital media, according to teacher IK, is very helpful in accelerating the learning process and facilitating the visualization of learning materials. The use of digital media is also considered more efficient in terms of time compared to manual teaching methods, such as writing on the board, as well as making learning more interesting and less boring for students. In reality, it shows that the application of digital-based media at SMAN 5 Batam is still varied. And the fifth teacher that the author asked for his response to the intensity of digital-based media utilization in learning was a teacher with the initials DV. Teacher DV said that almost in every learning process that takes place in his class, he utilizes digital media, because he thinks it is very helpful, there are many conveniences obtained when applying digital media as a learning tool, among others, digital media makes it easier for students to find material that is in accordance with their group assignments, so that the coverage of material can be broader, not only focused on what is written on the syllabus alone. In addition, by utilizing digital media in learning, the learning process is not boring (Zega et al., 2025; Selamat et al., 2013).

The professional skills of teachers at SMAN 5 Batam in the application of digital-based media vary. Not all teachers have the same skills in using this technology effectively. Therefore, it is important to evaluate and understand the extent of teachers' ability in applying digital-based media in the learning process. Some teachers may already have adequate skills, while others may still face difficulties in utilizing this technology optimally.

Widodo et al. (2021) shows that the use of digital media can increase teacher creativity in preparing

teaching materials. The implementation of multimedia in learning does not only improve teacher professionalism but also has a positive impact on student learning outcomes. This finding is reinforced by Eveline et al. (2023), who state that TPACK (Technological Pedagogical Content Knowledge) competence is very important in supporting the effectiveness of technology-based learning. However, these studies have not specifically highlighted the use of digital media in improving teachers' professional skills. This raises important questions: to what extent is digital media actually utilized by teachers, and does this utilization contribute to improving their professional competence? The gap between the availability of technology and its utilization is an indicator of problems that need to be studied further.

Method

This study employs a quantitative descriptive research design. The quantitative approach was chosen because the research aims to measure the extent of the relationship between digital media utilization and the enhancement of teachers' professional competence using numerical data. According to Sugiyono (2017), the quantitative approach is based on the positivistic paradigm, which emphasizes concrete data that can be measured and analyzed statistically to produce objective conclusions.

In analyzing the data, this study integrates both descriptive and inferential statistical techniques. Descriptive statistics are used to provide a clear picture of how teachers utilize digital media in the learning process. This aligns with Sugiyono (2017) view that descriptive statistics aim to describe research data as it is, without making generalizations or drawing broad conclusions.

Meanwhile, inferential statistics are applied to examine the relationship or influence of digital media usage on teachers' professional competence. As Sugiyono (2017) explains, inferential statistics also known as inductive or probabilistic statistics allow researchers to analyze sample data and generalize the results to a larger population. Therefore, inferential analysis in this study is conducted to test the formulated hypotheses regarding the impact of digital media utilization on the improvement of teachers' professional competencies.

Result and Discussion

Result

Table 4. Reliability test results of research instruments

Variabel	Cronbach Alpha	Description
0-0.666	0.891	Reliabel
≥ 0.666	0.859	Reliabel

From the information in the table above, it is known that each variable has a Cronbach Alpha value of more than 0.6. Thus, the variables of digital-based media utilization and Teacher professional competence is concluded to be reliable according to what is listed in the Cronbach Alpha calculation. The results of the reliability test show a value of 0.891 for variable X and 0.859 for variable Y both variables are in the high category for reliability.

Discussion

The Pearson Correlation Test is used to determine whether there is a significant relationship between the intensity of the use of digital media and the level of improvement in teachers' professional competence. This correlation test measures the extent to which two variables, namely, digital media and professional competence are interrelated. If the results show a strong and significant correlation value, it can be concluded that there is a significant relationship between the use of digital media and teacher competence. To find the correlation of variables x and y, researchers used the Microsoft Excel program.

As for seeing the correlation interpretation in this study is through Table 5.

Table 5. Correlation interpretation

Correlation	Relationship level
0.800 to 1.000	Very strong relationship
0.600 to 0.799	Strong relationship
0.400 to 0.599	Medium relationship
0.200 to 0.399	Low relationship
0.01 to 0.199	Low relationship
0.00	No correlation

Table 6. Correlation interpretation

	X	Y
X	1	
Y	0.7702212	1

Based on the results of the correlation test above, the coefficient value is 0.770 from these results it can be concluded that there is a strong and statistically significant positive correlation between variable X (digital media utilization) and variable Y (teacher professional competence). This relationship is a

consideration for researchers in further analysis, namely the simple linear regression test to predict Y based on X.

Conclusion

The research entitled "Analysis of Digital-Based Media Utilization in Improving Teachers' Professional Competence at SMAN 5 Batam" is a quantitative descriptive study that investigates how the use of digital media influences teachers' professional competence. Conducted with 84 active teachers (22 males, 62 females) currently teaching, data were collected via a Google Form-based questionnaire, which not only ensured efficient responses but also reflected the teachers' practical engagement with digital tools. The inclusion of teachers from diverse subject areas allowed a cross-disciplinary perspective, revealing that consistent use of digital media supports knowledge sharing, instructional innovation, and professional development. These findings indicate a clear causal link: the more teachers integrate digital media into their teaching practices, the more their professional competence is enhanced, highlighting the essential role of digital technology in modernizing education and improving teaching quality at the secondary school level.

Acknowledgements

Thank you to the Dean of Dean of the Faculty of Education at Padang State University, the Head of the Postgraduate School, lecturers and students of the Educational Technology Study Programme at the Postgraduate School of Padang State University, as well as all parties who have supported the successful implementation of this research.

Authors Contribution

Conceptualization and methodology, writing—original draft preparation, E. and F.Y.J.; software, validation, formal analysis, and investigation, D. and R.; data curation, writing—review and editing, E.M., and A.H.A.D.

Funding

This research received no external funding.

Conflicts of Interest

There is no conflict of interest.

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