


Analysis of Strengths, Weaknesses, Opportunities, and Threats of Technological Pedagogical Content Knowledge of Sociology Teachers in Boyolali Regency

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A B S T R A C T

Twenty-first century education demands the integration of digital technology in classroom practice, including Sociology learning at the senior high school level. The Technological Pedagogical Content Knowledge (TPACK) framework provides a conceptual foundation for integrating technology, pedagogy, and content knowledge. This study aims to analyze the implementation of TPACK in Sociology learning in senior high schools in Boyolali Regency using a SWOT analysis approach. This research employed a qualitative descriptive design involving Sociology teachers as research subjects. Data were collected through interviews, observations, and document analysis, then analyzed using SWOT techniques to identify strengths, weaknesses, opportunities, and threats, followed by strategy formulation through a SWOT matrix. The results show that teachers' adequate understanding of TPACK, varied use of digital tools, and supportive school facilities constitute key strengths. However, uneven technological competence, limited digital devices, and dependence on internet connectivity remain weaknesses. Government support and teacher autonomy create opportunities, while technology misuse, student distraction, and changing policies pose threats. These findings imply the need for continuous professional development, infrastructure improvement, and consistent policy support to optimize the sustainable implementation of TPACK in Sociology learning.

Keywords: *Sociology Learning, TPACK, SWOT Analysis, SWOT Matrix*

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INTRODUCTION

Rapid technological advances are gradually shifting the role of humans as the main producers of knowledge and culture (Hamsah et al., 2023). The integration of technology in learning is a necessity, especially to answer the characteristics of digital native students (Mesra et al., 2022). In a theoretical framework, Technological Pedagogical Content Knowledge (TPACK) is a development of the PCK concept that emphasizes the synergistic integration between content knowledge, pedagogy, and technology in learning practice (Schmidt et al., 2009). Studies over the past five years have shown that the implementation of TPACK contributes significantly to improving student engagement and learning outcomes in various subjects (Distianti & Ernawati, 2023; Salsabilla & al., 2023).

In the context of Sociology learning, TPACK is relevant because this subject requires analytical skills to dynamic social realities (Indarta et al., 2022). However, its implementation still faces obstacles to teacher technology competence, infrastructure limitations, and digital-based classroom management (Manza, 2023). Although various studies have examined the effectiveness of TPACK, studies using a SWOT-based strategic analysis approach are still limited, especially for Sociology teachers in semi-urban areas such as Boyolali. In fact, SWOT analysis allows for the comprehensive identification of internal factors (strengths-weaknesses)

and external factors (opportunities-threats) as the basis for the formulation of an implementable strategy.

This study aims to analyze the implementation of TPACK of Sociology teachers in three State High Schools in Boyolali using a descriptive qualitative approach with interview, observation, and documentation techniques. Data analysis is carried out through a SWOT matrix to formulate an optimization strategy. The results showed strengths in teachers' conceptual understanding and facility support, but there were weaknesses in uneven digital competencies and limitations of devices and the internet. Opportunities come from policy support and teacher innovation space, while threats include digital distractions and regulatory dynamics. The implication is that it is necessary to strengthen sustainable competencies and strategic policies so that the implementation of TPACK is more effective and contextual.

METHOD

According to Sugiyono (2023), methods are defined as scientific ways to obtain data with specific purposes and uses. The research method is a strategy or plan used by the researcher to obtain research data to provide interpretation related to the research objectives. Research uses a qualitative method, which is research with case studies that focus on research that is carefully conducted on an event, activity, process, or group of individuals. Where, this case study is limited by time and activity (Sugiyono, 2023). This research was carried out in Boyolali with three different schools, namely SMA Negeri 1 Banyudono, SMA Negeri 3 Boyolali, and SMA Negeri 1 Andong.

Research Design

This study uses a *qualitative descriptive research design* with a case study approach. This design was chosen to gain an in-depth understanding of the implementation of TPACK for Sociology teachers in the real context of learning and analyze it strategically using the SWOT framework. The case study was limited to the context of the time, place, and learning activities in the school studied.

Participants

The research participants consisted of Sociology teachers from three public high schools in Boyolali Regency, namely SMA Negeri 1 Banyudono, SMA Negeri 3 Boyolali, and SMA Negeri 1 Andong. The criteria for participants include: (1) teachers actively teaching Sociology, (2) have applied technology in learning, and (3) are willing to be research informants. The selection of participants was carried out purposively to obtain data relevant to the focus of the research.

Data Collection Techniques

Data collection techniques include: (1) Interview – Semi-structured interviews to explore teachers' conceptual understanding of TPACK, learning strategies, and implementation constraints. (2) Observation – Direct observation of the learning process to identify the practice of integrating technology, pedagogy, and content. (3) Documentation – Analysis of documents such as lesson plans/teaching modules, learning media, and evaluation tools used by teachers.

Data Analysis

Data analysis is carried out interactively through data reduction, data presentation, and conclusion drawn. Furthermore, it is carried out: (1) Identify internal and external factors that affect the implementation of TPACK. (2) Classification of factors into Strengths, Weaknesses, Opportunities, and Threats components. (3) Strategy formulation through a SWOT matrix to determine the position and direction of development.

Data Validity

The validity of the data is guaranteed through triangulation techniques and triangulation of sources, as well as *member checking* to ensure the suitability of the researcher's interpretation with the participant's perspective.

FINDINGS AND DISCUSSION

The implementation of TPACK at SMA Negeri 1 Banyudono can be seen in the Sociology learning process with a Project Based Learning (PjBl) approach. Where, the teacher uses learning videos to explain the initial concept of the material to be discussed, then provides reinforcement with examples in daily life. Then, the teachers gave a project that combined entrepreneurship in the P5 project with the local culture and wisdom that was around them. The results of the project were then presented in a blog that they created themselves and summarized in the form of a power point to be presented. The project was then also continued with training on creating a classroom blog for the sake of learning. Where, teachers provide a forum for students to develop their potential through these training activities. Thus, equipping students to use technology wisely, especially to help in the Sociology learning process. In the Sociology learning process, teachers also emphasize contextual learning through various examples that are indeed close to students. However, teachers still tend to use conventional methods that make students less motivated to learn.

Sociology teachers at SMA Negeri 3 Boyolali also take a Project Based Learning (PjBl) approach, teachers provide opportunities for students to develop their creativity through the projects given. In fact, teachers also provide freedom in utilizing AI (Artificial Intelligence) for their projects. Then, to ensure understanding from students, during the question and answer session on the presentation, they are not allowed to look for answers through mobile phones. Mobile phones are only used as a tool to facilitate them in working on projects given by teachers. That way, teachers can still ensure the extent of students' understanding of the material they are presenting.

Meanwhile, the Sociology learning process at SMA Negeri 1 Andong integrates a lot of technology into the Sociology learning process. This can be seen from the use of interactive websites as a diagnostic assessment to test students' initial understanding. Based on the results of observations from the researcher, the Sociology learning process begins with triggering questions and learning videos placed in Google Classroom so that it is easily accessible to students. Students will first work on the question which is connected to the learning website. Based on the results of the interview, the teacher explained that technology is widely used to liven up the atmosphere or when students have begun to get bored with the Sociology learning process that day. The integration of technology is also seen in the use of learning websites such as word walls, quizziz, and other interactive websites to create a learning process that is not rigid and fun.

Through the Firelaw (Field Research of Local Wisdom) method, teachers provide opportunities for students to conduct research on local wisdom in their area. In the process, they integrate technologies such as the use of Microsoft Word for research design and utilize various platforms to find reference sources for their research. The teacher also explained that with this project, in addition to being able to operate the technology, it also fosters the confidence they have. That way, the Sociology learning process is not just a transfer of Sociology material but also has an impact that can be felt by students both in the short and long term.

Results of Internal Factor Identification

Based on the results of the analysis of internal factors, there are several strengths in the application of TPACK-based Sociology learning. Teachers have a sufficient understanding of the TPACK framework so that they are able to integrate aspects of technology, pedagogy, and content in the learning process. In addition, the use of a variety of technologies and the use of various learning platforms provide an alternative teaching method that is more innovative and not monotonous. Students' responses to technology-integrated Sociology learning also show a positive attitude, which indicates that this approach is relevant to the characteristics of the current generation. The support of adequate school facilities also strengthens the implementation of TPACK, coupled with collaboration in the Pancasila Student Profile Strengthening Project (P5) in the era of the Independent Curriculum which further opens up space for technology integration in learning.

However, there are several weaknesses that still need to be considered. Dependence on internet networks such as WiFi or servers that sometimes experience interruptions is a technical obstacle in the implementation of learning. In addition, there is still a dominance of lecture methods used by some teachers so that the use of technology is not optimal. The lack of consistency in the use of learning platforms also affects the effectiveness of the teaching and learning process. The limitations of the devices owned by teachers are another obstacle in maximizing TPACK-based learning. In addition, the information technology (IT) skills of some teachers still need to be improved, as well as the limited learning time that makes the implementation of teaching modules not fully run as planned.

Results of Identification of External Factors

From the external side, there are a number of opportunities that can support the application of TPACK in Sociology learning. Support from schools and the government through various workshops, seminars, and discussion rooms such as the Boyolali Sociology MGMP provides opportunities for teachers to continue to improve their competence. In addition, the freedom for teachers to innovate and utilize various technologies is a great opportunity in developing creative learning. The availability of various online platforms that can be accessed for free also makes it easier to archive and manage materials digitally. The existence of mentoring through the Independent Teaching Platform (PMM) further strengthens teachers' efforts in understanding and implementing various relevant learning approaches.

On the other hand, there are several threats that have the potential to hinder the implementation of TPACK. Misuse of technology, such as the improper use of AI, can reduce students' critical thinking skills. The use of mobile phones in the classroom also has the potential to cause distractions that interfere with study concentration. The gap in infrastructure between schools also affects the effectiveness of TPACK implementation, especially in schools with limited facilities. In addition, dynamic changes in government policies require teachers to continue to adapt. The TPACK-based learning design process which requires extra time and energy is also a challenge for teachers in carrying out their professional duties.

SWOT Matrix of Sociology TPACK Implementation

The results of the identification of internal factors in the form of strengths and opportunities, as well as external factors in the form of weaknesses and threats in the implementation of TPACK for Sociology teachers in Boyolali, are then used as factors to determine strategies that can be seen in the following SWOT matrix table.

Table 1. SWOT Matrix for the Implementation of TPACK for Sociology Teachers in Boyolali.

| | STRENGTHS (S) | WEAKNESSES (W) |
|-------------------|---|--|
| INTERNAL FACTORS | a. Sufficient understanding of the TPACK.b framework. The use of technology variations in the learning process.c. Utilization of various platforms for teaching variety.d. Positive student response with the Sociology learning process that is integrated with technology.e. Collaboration with P5 activities in the era of the Independent Curriculum. | a. Dependence on an internet network such as WiFi or down-server servers.b. The dominance of the use of the lecture method in some teachers.c. Lack of consistency in the use of learning platforms.d. The limitations of the devices owned by teachers so that Sociology learning with TPACK has not been maximized.e. IT skills are still not mastered by some teachers.f. Some teachers have limitations in carrying out the learning process in accordance with the teaching module due to limited learning hours. |
| OPPORTUNITIES (O) | a. Support from schools and the government through various workshops, seminars, and discussion rooms through MGMP Sociology Boyolali.b. | SO STRATEGY |

| | | |
|-------------|---|--|
| | Freedom for teachers to utilize various technologies and innovate.c. The availability of various online platforms that can be accessed for free for online archiving.d. Assistance for teachers in understanding various approaches to the Sociology learning process through the PMM platform. | |
| | a. Strengthening TPACK-based learning innovations through training programs, workshops, good practices, and programs from MGMP Sociology of Boyolali Regency.b. Development of digital media and teaching tools for Sociology.c. The use of contextual interactive platforms to optimize technology-based Sociology learning.d. The use of PMM as a strengthening of technology-based pedagogic skills. | STRATEGY. Training and monitoring of structured IT training programs for Sociology teachers.b. Consistency and sustainability of the use of learning platforms at the school level.c. Simplification of TPACK teaching tools.d. Provision of school device management or borrowing programs for teachers. |
| THREATS (T) | a. Misuse of technology such as AI that hinders students' critical thinking skills.b. The use of cellphones in the classroom makes students more easily distracted.c. School infrastructure gaps that affect the effectiveness of TPACK implementation in Sociology learning.d. Government policies that change so that teachers must continue to adapt to changes.e. The process of designing Sociology learning with the TPACK framework requires a lot of extra time and effort. | STa STRATEGY. Digital literacy policy and ethics of using AI in Sociology learning.b. Strengthening interactive learning models to attract interest and increase student motivation.c. Mapping and planning of digital learning infrastructure.d. TPACK-based curriculum adaptation training. WTa STRATEGY. Prepare a "hybrid low-tech" learning plan.b. Make a firm agreement about the rules for using gadgets during the Sociology learning process.c. Efficiency of learning design such as the provision of digital question banks or automated rubric templates.d. Intensive assistance for teachers who are not yet ready for TPACK. |

Discussion

This study found that the implementation of TPACK by Sociology teachers in Boyolali has been seen in the use of learning technology, such as Google Classroom, PowerPoint, and Google Drive to manage materials and assignments digitally. The implementation of learning is also supported by the availability of school facilities, ranging from WiFi to other ICT devices. This support has a positive impact on the learning atmosphere, because students show a higher interest in the Sociology learning process that integrates technology, especially in activities that adopt an active model such as Project Based Learning (PjBL), although in some conditions they prefer learning with a Problem Based Learning (PBL) approach. This condition then becomes an internal force that becomes the main capital for the application of TPACK in Sociology learning.

However, this study also found that the implementation of TPACK in Sociology learning is not fully optimal. Inequality in the ability to use IT between teachers, limited time

in developing TPACK-based learning tools, limited support devices owned by teachers, and dependence on internet network stability are still major obstacles. This obstacle can be the cause of the lack of optimal integration of technology into Sociology learning, so that the use of technology has the potential to be only administrative or additional.

From external factors, the opportunity to strengthen the implementation of TPACK in Sociology learning can be seen through opportunities in training activities, workshops, and MGMP forums, accompanied by a large selection of learning platforms that can be accessed for free. Even so, there are threats that need to be considered, such as the distraction of using gadgets during learning, the potential for inappropriate use of AI by students, the gap in facilities between schools, and the ever-changing dynamics of education policies. Thus, the SWOT analysis indicates that strengthening the implementation of TPACK needs to be strategically designed, not only maximizing innovation, but also strengthening teacher readiness and preventing digital learning challenges.

TPACK Implementation Strengthening Strategy

The strategy to strengthen the implementation of TPACK is prepared based on a SWOT matrix which includes four alternative strategies, namely SO, WO, ST, and WT. Where, these strategies can be described as follows.

The SO strategy focuses on optimizing the strengths that teachers and schools already have by taking advantage of existing external opportunities. Teachers' understanding of TPACK, relatively adequate school facilities, and positive student responses can be maximized through learning innovations in MGMP forums and workshops, as well as the development of digital Sociology teaching tools that can be used together. By utilizing the positive response from students and the freedom of teachers to innovate, it also creates opportunities to optimize Sociology learning that integrates technology through interactive learning media platforms such as local wisdom observation projects that use technology. The existence of the PMM website can also be optimized by teachers to help find ideas and inspiration in designing the Sociology learning process with the TPACK framework.

The WO strategy emphasizes on fixing internal weaknesses with the support of external opportunities. More structured technology training is needed to overcome the inequality of teachers' competence in utilizing technology. The standardization of platforms at the school level is also needed so that the learning process is more uniform, efficient, and easy to monitor. This uniformity can ensure the sustainability of the use of technology for Sociology learning. For example, by using Google Classroom or a learning blog. In addition, the existence of a TPACK-based teaching tool template can help teachers save time without reducing the quality of technology integration. Where, the ready-to-use template can make it easier for teachers to organize and plan learning even though they experience limited class hours. Schools also need to provide loans or optimal management of devices that will be used by teachers in carrying out Sociology learning that integrates technology.

ST's strategy is directed at the use of internal power to deal with threats. In order for technology not to become a source of distraction, Sociology learning requires strengthening digital literacy, including affirming the ethics of using AI. At the same time, active learning models such as PjBL and social case analysis can shift the use of gadgets towards more meaningful learning activities. In addition, TPACK-based teaching tools are also needed because they allow teachers to be more adaptive when facing policy changes. The government also needs to conduct infrastructure mapping and planning to ensure that there is no gap in ICT facilities in each school.

The WT strategy is used as a defensive measure to deal with high-risk conditions. Learning with technology makes teachers then depend on the internet network which sometimes experiences obstacles. Therefore, it is important for teachers to plan low-tech hybrid learning such as printed LKPD, videos that can be viewed without streaming, to assessments that can be carried out offline. Strengthening the rules for using gadgets and preparing more efficient teaching tools can also help keep Sociology learning running effectively. In overcoming the weaknesses of IT skills in teachers which have the potential to

be a big risk along with the ever-changing policies and rapid technological advances, intensive assistance is needed to maximize teachers' ability to use technology.

In general, the recommended priority strategies include platform standardization, continuous IT training through the Boyolali Regency Sociology MGMP forum or PMM, strengthening active learning, and developing low-tech hybrid learning so that the implementation of TPACK can be sustainable.

CONCLUSIONS

This study aims to analyze the implementation of TPACK of Sociology teachers in Boyolali and formulate an optimization strategy through SWOT analysis. The results of the study show that the implementation of TPACK has gone quite well. Teachers utilize various learning technologies such as Google Classroom, PowerPoint, Google Drive, and interactive websites, and integrate them with active learning models such as Project Based Learning (PjBL) and Problem Based Learning (PBL). This integration increases students' motivation, participation, and learning engagement, especially in collaborative and contextual activities. Based on the SWOT matrix, the strategic position is in Quadrant I (growth strategy) because internal strengths—conceptual understanding of TPACK and support for school facilities—are more dominant than weaknesses, and are supported by external opportunities in the form of government policies and teacher innovation spaces. However, the implementation has not been fully optimal due to the inequality of digital competence between teachers, limited devices, limited planning time, and dependence on the internet network. External threats also appear in the form of distractions in the use of gadgets, the potential for AI abuse by students, infrastructure gaps, and the dynamics of education policies. Practical recommendations include: (1) continuous needs-based technology training through MGMP, (2) strengthening project-based and problem-integrated Sociology learning design, (3) developing hybrid learning that is adaptive to infrastructure conditions, and (4) drafting ethical guidelines for the use of digital and AI devices in schools. Follow-up research is recommended using a quantitative approach to test the effect of TPACK implementation on learning outcomes empirically, as well as cross-regional comparative studies to produce a more comprehensive and generalizable strategic model.

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