Challenges of Using Digital Content in Science Classrooms: Perceptions of Secondary School Teachers

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Article Info	Abstract
	Utilizing technology in science classes can be crucial to actively implementing the secondary school curriculum. These days, a substantial portion of Bangladesh's secondary science education is conducted through the use of digital content combined with technology and the internet. Students' attitudes, motivations, and participation in science classes in secondary schools are significantly transformed by the use of digital content. The purpose of this study was to determine what difficulties arise when using digital content in secondary science classrooms. Survey research design was followed to conduct the study. To collect data for this research, a total of 180 science teachers of secondary school were selected as a sample. Data was gathered through survey questionnaires. The quantitative data that were gathered through questionnaire were subjected to analysis using SPSS and MS Excel. The results of the study showed that secondary school science teachers employ digital content and technologies in their science instruction, but that their use is still subpar due to a lack of infrastructure and stakeholder perception. However, most schools still do not use a lot of technology in their science classrooms. Due to time constraints, a lack of experience integrating technology into their teaching, stringent policies from the school administration, issues with electricity, and other factors, the majority of teachers are not interested in utilizing technology in the classroom. Nevertheless, time is required to get past these challenges and influence teachers' and students' behavior in order to successfully integrate digital content into science classrooms in Bangladesh's secondary education system.

Introduction

For inquiry-based learning, digital content especially simulation tools are seen as a potent tool. These resources give students the ability to perform virtual experiments, evaluate information, and make inferences, all of which are critical abilities in scientific research (Byeon, 2024) (Kay, 2011). Instructors value how, in contrast to conventional lab experiments, digital simulations can save time and money while still offering significant educational opportunities (Byeon, 2024). Assessment tools like quizzes and interactive exercises are frequently integrated into digital curriculum, making it simpler for educators to monitor student progress and give prompt feedback (Walan, 2020). This helps find areas where students might require more attention in addition to streamlining the evaluation process.

The use of e-learning and digital content in Bangladeshi secondary school instruction is steadily rising. The use of e-learning and digital content in education can have a significant impact (Brent, 2005 cited in Chowdhury et. al., 2011). Science classes in secondary school mostly rely on textbooks. The science curriculum is taught to the students by the teacher using a descriptive textbook. Students typically commit the material to memory and lose it after a set amount of time. Nonetheless, teachers concur that the information is not all that memorable, and it is easily understood. Students should instead comprehend the material as well. Thus, it is crucial to present the material to the students in an engaging way. It takes time to prepare and use digital content in science classes because Bangladesh has made the use of information and communication technology (ICT) in education a high priority. Students will engage with the teacher, and it will undoubtedly assist the teacher in presenting the lesson in a visible and engaging manner.

According to Sayed et al. (2017), one of the main goals of creating a digital Bangladesh is the use of ICT in the education sector. The Bangladeshi government (GOB) has acted promptly to establish digital classrooms in all of the nation's schools in order to accomplish this goal. Additionally, they discovered that practically all teachers receive assignments from school administrators for tasks other than teaching regular classes. In this instance, teachers are unable to prepare and regularly update content for the digital classroom while in class. Teachers are also open to utilizing the digital classroom because it provides high-quality content on pertinent subjects, making it easier for students to understand the material.

When digital content is used properly in science classrooms, it can help teachers make the subjects more engaging and visually appealing. Students will also interact more with the material when it is visible to them rather than just in the text book. There is also the possibility of tailored learning with digital tools. More personalized instruction is possible when teachers utilize web-based learning resources to customize lessons to each student's needs (Kay, 2011). Digital information can also support flipped classroom strategies, which allow students to interact with the subject outside of class, freeing up class time for debates and practical exercises (Bo et al., 2018). In order for digital content to be relevant to the content in textbooks, teachers must possess expert preparation skills. As a result, in order to prepare and implement the digital content, teachers will need training. Simultaneously, teachers must pay attention to the monitoring system from the appropriate authority in order to enhance the way they implement digital contents.

The potential to improve teaching and learning outcomes has made the integration of digital information into scientific classrooms a major area of focus in contemporary education. Since their opinions and experiences with digital content have a big impact on its uptake and efficacy, secondary school teachers are essential to this process. Using information from pertinent research papers, this response examines the perceived advantages, difficulties, and efficacy of using digital content in science courses. Digital content is typically seen by educators as a useful instrument for raising student motivation and engagement. The capacity of instructional games, virtual labs, and interactive simulations to pique students' interest and simplify difficult scientific ideas is especially noteworthy (Bo et al., 2018). For example, interactive simulations help students better understand abstract concepts by allowing them to investigate scientific events in a controlled setting (Bo et al., 2018). It has also been demonstrated that playing video games in science classes improves students' cognitive and emotional involvement, which makes learning more fun and participatory (Yang, 2021).

The absence of proper infrastructure and technical assistance is one of the biggest problems instructor encounters. Many schools suffer from erratic internet connections, antiquated hardware, and restricted access to digital tools, especially those in rural or resource-constrained places (Paje et al., 2021). The successful integration of digital content into the classroom may be hampered by these problems. Instructors frequently complain that it takes a lot of time and work to incorporate digital content into their classes. It can be quite difficult to prepare digital materials, acquire new tools, and modify information to fit curricular needs, especially for people who already have a lot on their plate (Wohlfart & Wagner, 2023) (Ajani, 2024). Even when the potential advantages of digital content are acknowledged, this may result in opposition or restricted use. According to Paje et al. (2021), a lot of educators believe they are not equipped with the technical know-how and training needed to employ digital tools in the classroom. Teachers must handle the complexity of digital information on their own since professional development programs are frequently inadequate or nonexistent (Ngaya et al., 2024).

According to Deutscher (2009), the first issue with utilizing multimedia technology is a technical one. Technical issues can occasionally cause multimedia to start malfunctioning. Teachers become frustrated in such a situation. Once more, he discovered that the majority of educational establishments lack sufficient computer resources to accommodate every student. Even though there are a lot of advantages to using ICT in education, teachers frequently fail to utilize all of the technology's potential because they lack the necessary ICT literacy. One of the primary drivers of technology use in educational settings is the attitude and beliefs of teachers (Almusalam, 2001). The fundamental component of ICT implementation in education, according to Mumtaz (2000), is teachers' beliefs about integrating ICT in teaching-learning.

Making sure that digital content is pertinent to students' individual needs and complies with curriculum requirements is another difficulty. Finding or producing digital resources that align with the breadth and order of their lesson plans can be challenging for educators (Gezer & Durdu, 2024). Digital content can increase student engagement, but it can also be distracting, especially if kids are not given the right guidance. Instructors have observed that if the curriculum is not properly planned or executed, some students may abuse digital tools or lose interest (Zhang, 2024). Supporting underachievers and successfully integrating inquiry-based learning with digital technologies presented difficulties for teachers.

Additionally, they observed that evaluating the quality of presentations vs content was challenging, and that technological problems like internet connectivity affected the entire teaching process (Walan, 2020). Due to poor usability and difficulty integrating lessons, many secondary school teachers find it difficult to use digital resources. Although they criticize it for not enough inquiry activities and realistic experiences, they see simulation content as helpful for virtual inquiry (Byeon, 2024).

Lack of practice delivering lectures, poor incentives for using digital content, and inadequate assistance for content production are the primary issues noted. These obstacles make it more difficult for Bangladeshi secondary school science teachers to successfully use digital classrooms (Sayed et al., 2017). Insufficient student engagement and direct supervision during blended learning, incompatibility of applications with devices, erratic internet connections, restricted access to premium features of online tools, and a lack of digital competency are among the difficulties faced by secondary science teachers (Ramos & Taghap, 2023).

Purpose and Research Questions of The Study

This study's primary goal was to investigate the difficulties associated with using digital content in the teaching and learning of science. The results will assist in enhancing student enjoyment and creating a welcoming learning environment in secondary school classrooms using multimedia. Additionally, this research will determine whether or not teachers are interested in using digital content as teaching tools. The results of this study will assist secondary educators in discussing issues that arise when utilizing digital content in the classroom. Following were the research questions for this study:

    i. What extent do of the teachers use digital content in the science classroom?
    ii. What are the reasons of using digital contents by teachers in science classroom?
    iii. What are the challenges of using digital content in science classroom teaching learning process?

Significance of the Study

The goal of this study is to better understand the difficulties teachers encounter when using digital content to teach science courses in the classroom. An attempt was made to determine the barriers found in the science classroom. Simultaneously, an effort was made to evaluate the difficulties associated with incorporating digital content into science education and the ways in which science instructors are implementing it in the classroom. Research indicates that digital content can have a positive impact on student learning outcomes. Web-based learning resources, for instance, have been demonstrated to enhance student performance in a number of knowledge domains, such as recall, comprehension, application, analysis, and evaluation (Kay, 2011). Better conceptual understanding is also facilitated by interactive simulations and virtual labs, especially in courses like physics and chemistry (Byeon, 2024) (Bo et al., 2018). Students will be drawn to science education and interactive learning if the use of digital content in science classes is planned properly. The number of students will therefore rise and science teaching and learning will be more dynamic and successful if the content is presented in an appealing digital format and is implemented by qualified teachers. In any case, the results will point out the difficulties and provide solutions to guarantee that digital content is used effectively for interactive and long-term learning.

Limitation of the Study

This research is not without limitations. A restricted number of teachers participate in the survey conducted by the researcher. Only the chosen teachers who received instruction on digital content from TTCs were included in the study's samples. As a result, the study's conclusions might only apply to the group of educators who share traits with the individuals chosen for the research. The researcher was unable to watch all the sample teachers using digital content in the science classroom due to time constraints. As a result, there were very few classroom observations made to collect data. The bulk of the data came from the questionnaire. This study did not concentrate on a thorough qualitative examination of the variables that might have affected the difficulties in implementing digital content in science education.

Methodology

Study Design

This study employs a cross-sectional survey research design of quantitative research method to systematically collect and analyze numerical data from a representative sample, which is best suited for systematically collecting numerical data to identify patterns, relationships, and trends. The survey method is chosen due to its efficiency in gathering data from a large population, ensuring objectivity and statistical validity. The research followed a cross-sectional approach, where data is collected at a single point in time. This allows for an analysis of the current conditions and perceptions among the target population.

Sample and Sampling Techniques

The sample of the study was the science teachers of secondary schools. In order to select the sample of teachers' random sampling technique was followed. Teachers' responses about the challenges of using digital content in science teaching learning process and disclosing is very pertinent to this study. Therefore, a total 180 teachers were selected among the teachers who received training on digital content from the teachers' training colleges for collecting the relevant information. These 180 teachers were consisting both male and female teachers. An attempt was made to keep the ratio of male-female teachers as equal as possible.

Instruments

A structured questionnaire was designed, consisting of closed-ended questions, Likert-scale items, and multiple-choice questions to ensure quantifiability. The questionnaire was used to gather data because it is the most suitable way to involve a sizable sample population in a short amount of time and obtain the required information. A group of respondents were tested with the questionnaire before finally administered.

Data Collection Procedure

Along with the hard copy version of the questionnaire, participants also received an online version via Google

Form, which was intended to boost the response rate. A total of 180 secondary school science teachers who had received training on the digital content were given the questionnaire.

Data Analysis

Descriptive data analysis was performed in analyzing the quantitative data as it helps in condensing large volumes of raw survey responses into meaningful statistics, making interpretation easier. And it helps to identifies common trends, frequencies, and distributions within the dataset by using charts, tables, and graphs to facilitate clear and intuitive presentation of findings. Hence, the Quantitative data from the questionnaire was displayed.in terms of percentage, graphs, and other metrics.

Ethical Considerations

The researcher ensured confidentiality by assuring that any information participants provide will be used only for the purpose of the study, with categorization and reporting done anonymously. By obtaining informed consent and protecting the respondents' anonymity and confidentiality, the researcher ensured the high caliber and integrity of the study. The necessary data for this study was gathered in an ethical and person-sensitive manner. The confidentiality and anonymity of all the data were maintained to safeguard the identity of the participants or respondents. The participants had been informed of the purpose and goal of the study. Respondents received assurances and guarantees that the information gathered would be handled with the utmost confidentiality and that they could withdraw from the study at any time without having to give the researcher a reason. The participants were also apprised of their entitlement to obtain access to the study's ultimate outcome.

Results of the Study

Use of Digital Content by Teachers in the Science Classroom

Half (50%) of the participant teachers answered that they develop digital content for science classes once or twice a week. A good number (30.8%) of them responded that they develop the digital content once or twice a month. On the other hand, only 7.7% teachers develop the digital content for science classroom on daily basis. Surprisingly, a significant number (7.7%) of teachers responded that they never develop any digital content for science classroom. Teachers were asked about their using frequency of digital content in science classroom. According to half (50%) of the respondents, they use digital contents once or twice a week. Moreover, 34.6% teachers responded that they use digital content for science teaching one or two time in a month. In contrast, only 7.7% teachers answered that they use digital content in science teaching learning on regular basis. Majority (53.8%) of the teachers replied that they use computer once or twice in a week. 19.2% teachers responded that they use computer one or two time in a month. Nevertheless, 23.1% teachers said they use computer on daily basis (see Figure 1).

All the participant teachers (100%) informed that they prefer Bangla as language to use digital content for science classroom teaching. Majority (57.7%) teachers replied that they use the MS power point application frequently

for presentation purpose. However, there were a number of teachers who download content from various web sources (15.4%) and use YouTube lecture (11.5%) on frequently. A portion (7.7%) of the teachers answered that they use web browsing frequently as a part of ICT usage.
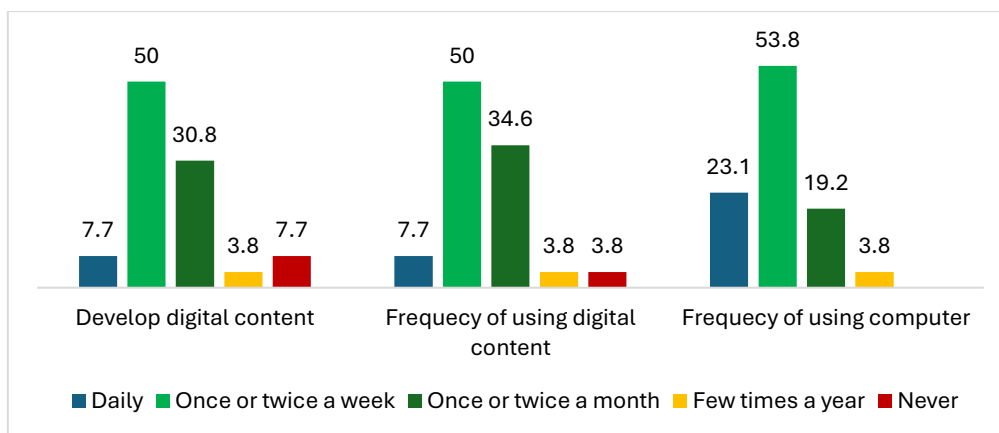

Figure 1. Usage of Digital Content and ICT

Half (50%) of the participant teachers informed that they use computer most of the time at school whereas 26.9% said they use computer occasionally. The number of teachers who use computer on regular basis (11.5%) and who never used computer (11.5%) are exactly same in terms of proportion. The frequency of using internet at school is quite impressive among the respondent teachers. According to them, 46.2% use internet on most of the time and 34.6% use internet repeatedly. There are few (19.2%) teachers who use internet at school now and then. Majority (46.2%) of the teachers use ICT lab at school from time to time. In contrast, a big number (34.6%) never used ICT lab at school whereas only 11.5% teachers always utilize the ICT lab at school. Nevertheless, all (100%) the teachers replied that they have access to educational materials from internet.

Reasons Teachers' Use Digital Contents in Science Classroom

More than half (53.8%) of the teachers replied that they use digital content to explain a concept to the students in science class. On the other hand, 38.5% said they use digital content for making presentation related to science teaching learning. There are 7.7% teachers who use digital content as a stimulator to start discussion in science class.

Most (42.3%) of the teachers completely agreed that digital content or digital teaching materials making science classes easy to organize. A good portion (34.6%) agreed with this similar enquiry. However, 23.1% teachers did not agree with the fact that digital teaching materials making science classes easy to organize. Most (38.5%) of the teachers agreed to the query about digital content or digital teaching materials making science classes easy to design. A good percentage (30.8%%) entirely agreed with this similar enquiry. However, 26.9% teachers did not agree with the fact that digital teaching materials making science classes easy to design. Teachers showed their positive response either in complete agreement (30.8%) or agreement (30.8%) when they were asked about opinion regarding the more structured status of science learning through digital content. In contrast, 26.9% teachers said they do not agree with the query (see Figure 2).
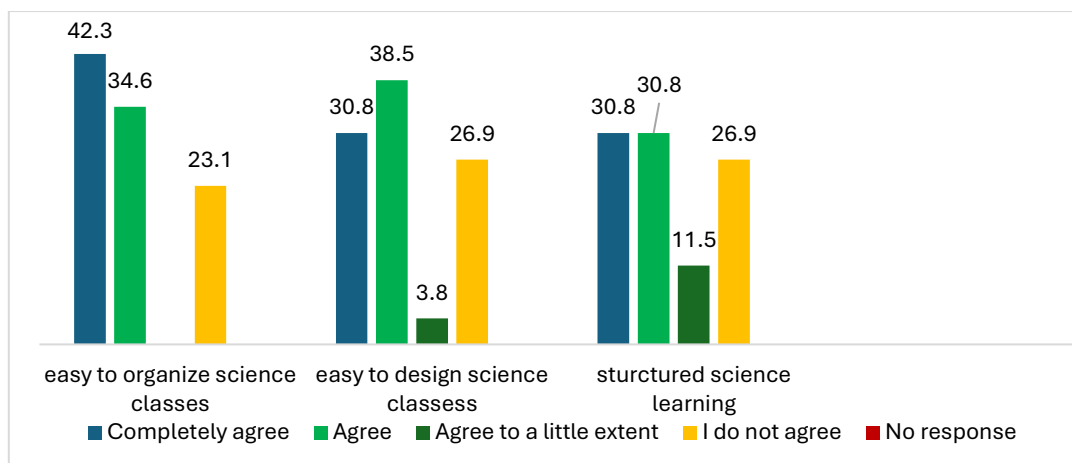
Figure 2. Perception of Teacher About Digital Content

Almost the entire portion of the teachers either completely agreed (23.1%) or agreed (69.2%) that they use digital teaching materials as new ways to learn. There was no disagreement among the teachers in this aspect. Majority (76.9%) teachers agreed that they use digital contents or teaching materials in science class for improving the efficiency of learning time. Half (50%) of the teachers agreed that they use digital contents in science class to lead students to automatic learning. Besides, 23.1% teachers agreed partially with this statement and 19.2% teachers completely agreed when they were asked the same question. However, 7.7% teachers showed their disagreement to this statement (see Figure 3).
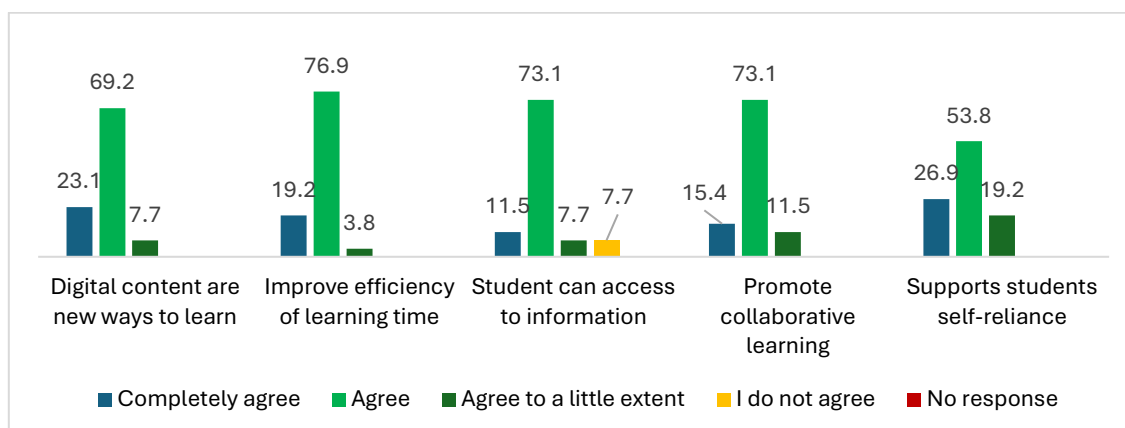

Figure 3. Reasons of Using Digital Content in Science Classroom

Majority (73.1%) teachers agreed with the query that they use digital teaching materials in science class to facilitate the students to access to information in contrast to only 7.7% teachers who disagreed to this. Moreover, 11.5% teachers showed their highest level of agreement with this question. In the statement regarding the usage of digital content in science class to promote and ensure collaborative learning, no disagreement was found among the teachers. All the teachers have either completely agreed (15.4%), or agreed (73.1%), or agreed to little extent (11.5%) with this statement.

When the participants were asked about their agreement with the statement mentioning that digital teaching

materials facilitate teachers in enhancing interactive learning, 73.1% responded with positive answer. Moreover, 19.2% completely agreed and 7.7% partially agreed to this statement. More than 80% teachers expressed their agreement with the statement saying digital content increase students' skills in the decision-making process to solve problem. Additionally, 15.4% teachers partially agreed and however, only a small (3.8%) portion teachers disagreed to this opinion. Teachers expressed their agreement with the statement saying digital content is useful in supporting students' self-reliance. 26.9% teachers completely agreed, 53.8% teachers agreed and 19.2% teachers partially with this agreement. No negative responses from the teachers were recorded for this statement. In case of the statement concerning digital content brings learning innovation to teaching, similar to other statements, teachers expressed their positive agreement. It was recorded that a big number of teachers either completely agreed (34.6%) or agreed (46.2%) with this statement along with some limited agreement (19.2%). From the response it was found that, majority (65.4%) of teachers agreed and one-fourth (26.9%) fully agreed that digital teaching materials or contents are very important as teaching materials. Nearly all the teachers (96.1%) have either completely agreed or agreed with the statement that digital teaching materials support science teaching and learning activities more quickly. Only a small portion (3.8%) teachers partially agreed with this statement.

In the statement regarding the usefulness of digital content as a tool for changing science learning in classroom teaching, no disagreement was found among the teachers. All the teachers have either completely agreed (23.1%) or agreed (53.8%). However, number of teachers agreed to little extent (11.5%) with this statement is also quite significant. Majority (53.8%) teachers agreed with the statement that digital teaching contents accelerate students' understanding for science subject. Moreover, 30.8% teachers disclosed their highest level of agreement with this statement and 15.4% teachers expressed their partial agreement. Teachers agreed that digital teaching materials or contents help students to understand science concepts. In this regard, high percentage of teachers have either totally agreed (23.1%) or agreed (69.2%) along with partial agreement (7.7%). When the teachers were asked to demonstrate their response with the statement 'digital contents or digital materials make students more active in science teaching learning process', 76.9% teachers agreed to this. Additionally, 15.4% teachers were highly aligned with this statement whereas 7.7% teachers agreed to this to a little extent (see Figure 4).
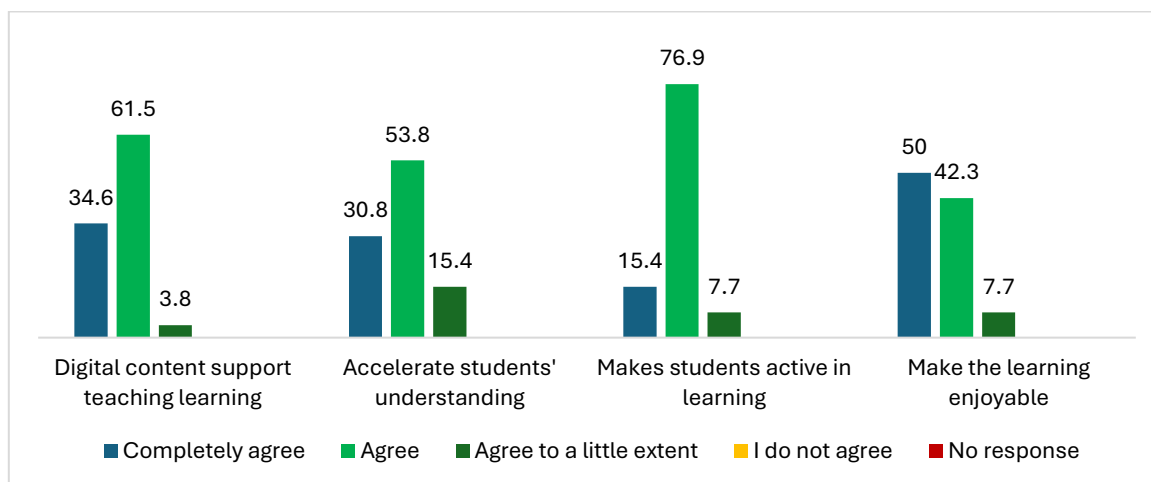

Figure 4. Reasons of Using Digital Content in Science Classrooms

It shows from the data that 61.5% teachers feel very confident, and 30.8% teachers feel confident when they use

digital teaching materials for science classes. In contrast, only a small portion (3.8%) teachers answered in the opposite direction. The response from the teachers also significantly demonstrates that they feel motivated to use digital content or multimedia for science classroom teaching. 92.3% teachers answered their agreement about feeling motivated when they use multimedia in science teaching

Half of the participants completely agreed and 42.3% agreed that digital content for science makes the learning process enjoyable to the students. Most of the teachers agreed that to develop digital content for science classroom lots of time is required. In total 84.6% teachers agreed that developing digital content is time consuming and difficult. However, 15.4% teachers did not agree to this statement, and they replied it is not time taking activity and difficult. When asking about the less efficiency of digital content for science teaching, 58.5% teachers disagreed with that which support their agreement for the effectiveness of digital content for science classes. However, 30% teachers still agreed that digital content usage for science classes is less efficient for learning.

Challenges of Using Digital Content in Science Teaching Learning Process

Teachers mostly agreed that lack of technical support on hardware and software issue is problem for using digital content in science teaching learning process. Only 7.7% teachers disapproved that technical support is not a problem. Majority of the teachers (84.6%) answered that unexpected power failure during the class hour is a problem for using digital content in science classroom. Teachers expressed that lack of computer in school is a problem for using digital content in science classroom and teaching learning process. 34.6% teachers completely agreed with this statement. Besides, 30.8% teachers answered in approval of this statement. In contrast, 23.1% teachers did not agree that lack of computer in school is a problem (see Figure 5).
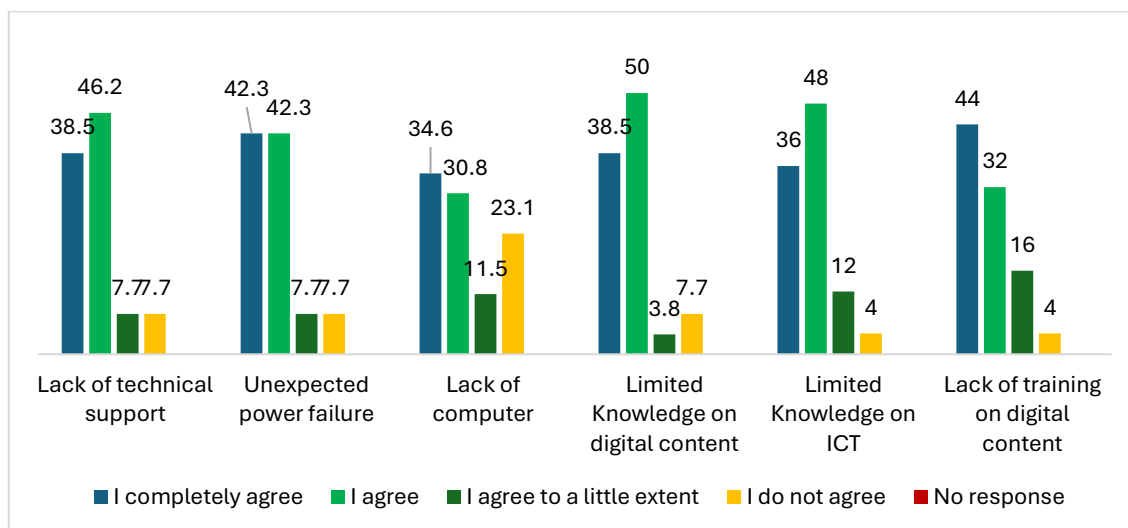

Figure 5. Challenges of Using Digital Content in Science Classroom

Majority of the teachers completely agreed (38.5%) and agreed (50%) with the statement that limited knowledge on creating digital content and appropriate usage is a problem for using digital content in science classroom. However, only 7.7% teachers differed to the statement than others. Teachers answered that limited knowledge on ICT and challenges to use ICT is a problem for using digital content in science classroom teaching. It was recorded

that 36% teachers completely agreed with this statement while other 48% teachers agreed. Teachers' response also goes in favor of the statement that lack of training in digital content preparation and application is a problem for using digital content in science classroom. Most of the teachers either fully agreed (44%) or agreed (32%) to this statement. However, a small portion (4%) teachers showed their disapproval to this statement.

Discussion

According to Sarowardy & Halder (2019), various researchers have discovered that traditional teaching methods should be combined with multimedia because utilizing multimedia alone does not foster students' creativity and critical thinking. The use of inappropriate and high-quality multimedia content by teachers is the second problem they discovered. Teachers occasionally use vibrant photos, videos, etc. Students' ability to concentrate is hampered by this. Thirdly, they stated that the fundamental idea has frequently stayed the same, with the only difference being the method from traditional to modern.

The study findings revealed that majority (50%) of the teachers develop and use the digital content in science teaching learning process once or twice in a week. The types of mostly used digital content for science classrooms at secondary level includes pictures, videos and textual information related to the content the teachers are teaching. The medium of instruction and language of the digital content the teachers preferred in this aspect is Bangla. The study findings also showed that most of the teachers use computer and ICT once or twice a week and the main purpose of using the technology is to make presentation in MS power point for the lesson they are teaching. Through the findings the usage of internet at school was highlighted by the teachers. Most of the school have internet connection and ICT lab facilities, however, majority of the teachers prefer to use the facilities occasionally except few who use on regular basis.

According to Winter et al. (2010), teachers thought that digital content helped with assessment, differentiation, and social construction of learning. ICT offers scientific discussions and communication opportunities that are interactive, which foster critical thinking, allow for constructive criticism of ideas presented, improve problem-solving abilities, and encourage ongoing self-learning (Al-Rsa'i, 2013). Using digital tools thus contributes to meaningful science learning. The study findings showed that teachers mostly use digital content for the better understanding of science concept. Teachers believed that using digital content can help the students to comprehend the topic better. Additionally, teachers use digital content for making presentation and stimulating a discussion into the science classroom. The findings revealed the opinion of the teachers on the reason of using digital content for the science classroom. According to the teachers' digital content has many advantages that enable them to conduct a quality science class for students. They agreed that digital contents making science classes easy to design and organize. Digital content helps the teaching learning more structured and a new way to learn science topic which improve the efficiency of learning time and lead students to automated learning or self-learning.

Findings of the study also support findings from other research works and pointed out why teachers use digital content in science classroom. Multimedia and digital content instruction improves students' conceptual grasp of science and helps them reach higher levels of scientific literacy (Al-Rsa'i, 2013). Multimedia and digital content-

based innovative teaching fosters inquiry-based learning, creativity, and positive attitudes toward science in students. Using digital content helps students understand how important science is to their future and how relevant it is to real-world situations (Walan (2020), Roza et al., (2022).

Despite of having numerous advantages of digital contents for science classroom teaching, findings of the study found that there are some challenges too. In the study the findings revealed that lack of technical support on hardware and software is a concern for using digital content in science classes. Teachers also pointed out that unexpected power failure or lack of uninterrupted electricity supply is another factor causing problem to consider and use digital materials for science classroom. The study highlights the main obstacles secondary school teachers encounter when utilizing ICT tools, such as restricted network connectivity and accessibility, a lack of technical assistance, inadequate training, time constraints, and teacher competency, all of which have an effect on how well digital content is incorporated into science classes (Ghavifekr et al., 2016). The study finds that major obstacles to efficient ICT use in classrooms include problems with hardware, a lack of technical assistance, and insufficient training. Despite their favorable opinions of ICT's educational worth, which is in line with Chauhan's (2024) research findings, these difficulties affect instructors' capacity to incorporate digital content.

While there have been examples of successful digital technology integration in science education, there have also been examples of unsuccessful implementations. The efficient use of digital technologies in the classroom is hampered by teachers' frequent encounters with poor infrastructure, such as erratic internet connections and a lack of technical support (Wohlfart & Wagner, 2023; Ghavifekr et al., 2016). Time limits, heavy workloads, deteriorating infrastructure, a lack of technical support, and a fear of change are some of the difficulties. In order to successfully incorporate digital tools into their chemistry teaching practices, educators also indicated a need for subject-specific training and resources (Wohlfart & Wagner, 2023).

Conclusion

When teachers use ICT for learning, they become more cautious when using it in the classroom. As they understand that ICT can easily lead students to real-life learning, they occasionally also believe that ICT is irrelevant in class-based instruction for encouraging cooperation and reflection in learning. Effective technology integration in scientific classrooms is hampered by issues like a lack of discipline-specific resources, poor training, and inadequate infrastructure, according to the report. Furthermore, low student technical competence and discontent with professional development make using digital information even more difficult (Dinçer, 2024).

To keep more science students in secondary education, the government has implemented several initiatives. Using ICT in the classroom is one of the main steps toward modernizing the learning environment. Priority is also given to setting up a digital classroom with multimedia tools, providing content development training for teachers, and allowing them to use laptop projectors in the classroom. But the full potential of the digital classroom has not yet been realized.

Encouraging students to use technology in secondary science classes has wider ramifications. In science

classrooms, the appropriate use of technology by knowledgeable and skilled teachers can significantly enhance and broaden student learning. Research has indicated that the incorporation of technology and the internet into science instruction enhances student learning. Students become more engaged in the classroom and interactive activities are encouraged. Moreover, it provides students with an open learning environment and enhances their understanding of material beyond course books.

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