Students' Perceptions of the Inorganic Chemistry Classroom Management Through A Web-Based Instructional System

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A R T I C L E   I N F O

A B S T R A K

Pengelolaan kelas dalam proses pengajaran khususnya mata pelajaran kimia akan menjadi signifikan agar hasil belajar menjadi optimal. Namun kegitan pembelajaran yang dilaksanakan saat ini kurang optimal sedangkan berdampak pada hasil belajar. Penelitian ini bertujuan untuk menganalisis persepsi mahasiswa dalam manajemen kelas mata kuliah kimia anorganik. Jenis penelitian ini yaitu penelitian kuantitatif. Metode dan instrument yang digunakan untuk mengumpulkan data yaitu instrument. Subjek penelitian ini adalah 40 mahasiswa. Teknik yang digunakan untuk menganalsis data yaitu analisis deskriptif kualitati dan kuantitatif. Hasil penelitian menunjukkan bahwa persepsi mahasiswa tentang GC berada pada kategori memuaskan dan merekomendasikan GC untuk digunakan dalam pelajaran lain. Effect size dihitung dari perbedaan rata-rata pre-test dan post-test sebelum dan sesudah pembelajaran dengan menggunakan rumus Cohen dan diperoleh efektivitas GC menurut kriteria Cohen adalah 1,77, yang berarti bahwa ukuran efek Google Classroom luas; maka GC sangat efektif digunakan dalam mengajar mata kuliah kimia anorganik. Disimpulkan bahwa pengelolaan kelas melalui sistem instruksional berbasis WEB efektif digunakan dalam pembelajaran.

A B S T R A C T

Class management in the teaching process, especially in chemistry subjects, will be significant, so optimal learning outcomes. However, the learning activities carried out at this time are less than optimal while impacting learning outcomes. This study analyzes student perceptions of class management in inorganic chemistry courses. This type of research is quantitative research. The methods and instruments used to collect data are instruments. The subjects of this study were 40 students. The techniques used to analyze the data were qualitative descriptive analysis and quantitative analysis. The results showed that students' perceptions of GC were in a good category and recommended GC to be used in other lessons. The effect size is calculated from the difference in the average pre-test and post-test before and after learning using Cohen's formula. The effectiveness of GC according to Cohen's criteria is 1.77, which means that the effect size of Google Classroom is wide. GC is very effectively used in teaching inorganic chemistry courses. It was concluded that classroom management through a WEB-based instructional system was effectively used.

1. INTRODUCTION

Learning is an activity carried out by the teacher programmatically in instructional design that creates a process of interaction between fellow students, teachers, and students and with learning resources. Learning aims to create continuous student behavior and thinking changes in a learning environment (Batubara & Batubara, 2020; Febriyandani & Kowiyah, 2021). A learning process cannot be separated from teaching and learning activities. One sign that someone has learned something is a change in his behavior (Dwiningsih et al., 2018; Hidayat & Muladi, 2016; Widodo, 2020). These behavioral changes involve changes that are knowledge (cognitive), skills (psychomotor), and those concerning values and attitudes (affective) (Ragil & Sukiswo, 2011; Silmi & Rachmadyanti, 2018; Widyantari et al., 2019). Learning does not only include subjects but also mastery, habits, perceptions, enjoyment, competence, social adjustment, various skills, and aspirations (Hertiavi et al., 2010; Susilo et al., 2018).

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During the learning process, the teacher's most important task is to condition the learning environment to support behavior change for students.

Over the last year, the global pandemic coronavirus has disrupted almost all human activities, including in higher education systems (Browning et al., 2021; Chang et al., 2020; Sia & Abbas Adamu, 2020). The face-presentation lectures are transferred into technologically online lectures to avoid the spread of viruses. Besides, the learning that occurs in a face-to-face lecture in class often gives students a sense of the importance of the figure of the teacher, boredom, and laziness to understand, primarily if the study is held after midday or in the afternoon (Barrios et al., 2014; Mpungose, 2021). This adjustment helps students build bridges to connect the simulated text to real-world situations presented visually with the support of computer programs. The classroom management in the teaching process in particular chemistry subjects would be significant so that learning outcomes are optimal (Dewi et al., 2019; Zendler & Greiner, 2020). Such a classroom transformation is significantly needed to be managed effectively by which webpage instructional app, for instance, Google Classroom (GC), could support the learning process by creating, managing, and accessing its usage and effectivity (Hidayati et al., 2020; Kumar et al., 2020; Mishra et al., 2020). Students' involvement in various learning activities computer-based affected their attitudes. Technology can help learners who have different learning styles to achieve learning goals (Islam Sarker et al., 2019; Kesharwani, 2020). This has become an essential part of learning. By integrating technology into teaching inorganic chemistry will encourage students to be motivated. Various computer programs are available such as GC, a program for lecturers and learners to create, distribute, and assess paperless assignments (Kakani et al., 2020).

Google Classroom (GC) is a web platform for the world of education that strongly supports learning and teaching activities because it is convenient and time-saving (Kumar et al., 2020; Siahaan, 2021). This application is also helpful for students learning content, listening, reading, and sending assignments remotely. GC is a program for lecturers to create digital classrooms to communicate with lecturers and students (Hidayati et al., 2020; Suhroh & Cahyono, 2020). It is an application that integrates e-mail and documents to be stored in storage. Lecturers can upload files, videos, links, and announcements, and it has been proved that digital learning can improve students' literacy capacity and critical thinking. Technology-based instruction provides a Google Classroom opportunity for students to learn and practice visually and in a virtual learning environment (Al-Maroof & Al-Emran, 2018; Purba, 2021; Santosa et al., 2020). Through GC, students can access lecture materials, interact with students and instructors, freely ask instructors and fellow students, and express their opinions through the digital system. Web-based instruction provides opportunities for students to study efficiently in the subject of inorganic chemistry (Bilik et al., 2020; Hwang et al., 2012). Inorganic Chemistry content is learning that requires cognitive, psychomotor, and affective capabilities. Sometimes students are bored with this course because student thinks its scope is not interesting to understand (Muchlis et al., 2020). Students should understand each component's characteristics, reactions, compounds, and application in science and the environment to memorize the elements in the Periodic Table. Various web-based instruction using e-learning technology has been carried out in chemistry, such as Schoology, Moodle (Febliza & Okatariani, 2020) and (Handayani et al., 2021). Studies on the effect of teaching chemistry using the Google Classroom platform on various topics have been done all approved that through the GC student could achieve their academic performance including attitude, knowledge, and skills (Mulatsih, 2020; Paristiowati et al., 2020). The research focus of the present paper is to provide a description of the perceptions and recommendations of students about GC as well as the effectiveness of learning Inorganic Chemistry management using GC. This study aims to analyze student perceptions of class management in inorganic chemistry courses at Tadulako University, Indonesia.

2. METHODS

This study was descriptive quantitative. The subject for this research was 40 students who enrolled in Chemistry Education Study Program at Tadulako University in the 2nd year or fourth semester, 32 females and eight males, and was between 19 and 22 years of age (M = 20.2). The majority of students (38%) were 20 years old. They have passed the preliminary course of Inorganic Chemistry in the previous semester. The questionnaires were adopted and modified from previous study, which consisted of five factors of several components, namely (i) accessibility/easy access, ii) privilege, (iii) communication and interaction, (iv) delivery of the lesson, and (v) student satisfaction (Shaharanee et al., 2016). Questionnaires were distributed to students in writing (for documentation) and online using the Google Form, where students will be given links through lectures in inorganic chemistry with the Google Classroom itself. The data collected was tabulated in percentage. The highest rate shows a positive tendency or the most, while the lowest percentage shows the negative trend or the least.

The integration of courses to GC is carried out with the following stages Firstly: Create Courses. The next stage for making the subject on Google Classroom refers to the guidebook. In the next stage, the theme was chosen to change the course's appearance or profile according to the design desired by the instructor/lecturer. Secondly: Completing the Stream. A stream is where lecturers see and add announcements, assignments, discussion topics, questions, and comments. In this section, the instructor will add lecture material through adding Topics for each subject or lecture meeting consisting of six chapters and equipped with handout material, videos, or other supporting references. Learning material can be downloaded from File attachments, Google Drive, YouTube, or Weblinks. Thirdly: Complete the About Tab. About Tab is a place for lecturers to add class details, including courses in course descriptions, syllabus, referral materials, and add another teaching/lecturer team, and more. As in the section above, the material can be added through File attachments, Google Drive, YouTube, or Weblinks. Fourthly: Submitting Tasks. with Google Classroom, lecturers can plan to give assignments that must be done by students. At this stage, the task will be prepared in documents with various scenarios, namely, functions sent directly and functions that will be sent scheduled.

The use of Google Classroom on learning and integration in the Inorganic Chemistry course was assessed for its effectiveness using the Cohen (ds) effect size equation (Lakens, 2013). The data analyzed were obtained from the results of the pre-test and post-test during the learning process. The amount of effectiveness was concluded based on Cohen's proposed criteria, namely: $0 < d < 0.2$ small effect; $0.2 < d < 0.8$ moderate effect; and $d > 0.8$ large effect. Google Forms was used for collecting the frequency data and all statistical data analysis was performed using Microsoft Excel.

3. RESULTS AND DICCUSSION

Results

According to the data collected from the questionnaire, there are 45% (18 students) said that the navigation of the GC system is the most excellent in the accessibility category, followed by the access to instructional materials, handouts, and power points, and the system navigation 42.5% (17 students), then access to e-book 37.5% (15 students). Most of the students experienced the excellence of the accessibility of GC. Only one student (2.5%) said that system navigation was low, and one student (2.5%) said access to e-book was poor. However, nobody said that access to teaching video, teaching material, handout, and PowerPoint was poor. This shows the students' perception of the privilege of GC. The data indicated that GC is an excellent LMS as social media (42.5%) because it has a chat room where students in the class can discuss topics outside the lesson, such as hobbies, favorite food, movies, etc. While as an evaluation system, GC is also excellent (37.5%), it is also useful as a communication facility with the teacher (42.5%). Students can chat the educator about the lesson or ask the question regarding the material because GC has its facility for communicating with the teacher.

Based analysis data, indicated students' perception regarding the frequency of communication and interaction between students and students with lecturers. According to students' perception, all indicators of communication and Interaction are the freedom to use chatting facility, teacher's effort to build communication with students, convenience interaction between students, the enthusiasm of the teacher to deliver the lesson, and the easiness of contacting the teacher indicated the average of 44% of very frequently. It was undeniable that students were never limited to use the chatting facility, never inconvenient to communicate between them, and also lecture was never unenthusiastic in delivering lessons.

Using GC application for inorganic chemistry classroom management. Based data analysis, shows that the teacher very frequently announces the time for the lesson (57.5%), told the time for exam and quiz (50%), report the topic of the task (47.5%), the teacher remains students about their assignment (50%), and teacher provide feedback (55%). No student said that the teacher never announces the time for the lesson nor provides input. However, a student (2.5%) said that the teacher never announces a time for the exam and quiz, never announces the topic of the lesson, and never reminds students of their assignment. Students' perceptions of GC Accessibility, GC Privilege, Communication, and Interaction at GC all showed positive opinions. The accessibility and the privilege are excellent, the communication and interaction through GC and lesson delivery by the teacher are persistent. It was necessary to find out the recommendations of students on their satisfaction use GC as an LMS. It was seen that out of 40 students there are 27 students said that they were delighted with the learning through GC and to recommend GC to be used in other subjects, 11 students said they were satisfied, and no one said they were not satisfied. This number is directly proportional to their reasons; 24 people say that they like GC as learning motivation and make GS their first choice of LMS.

The effectiveness of GC as an LMS in the teaching of Inorganic Chemistry at Tadulako University can be seen from the Cohen d (size effect), using the Cohen & Lakens formula. Based on calculations shown, the difference in the average value of the student's Pre-test and Post-test who participates in inorganic chemistry is 5.64, with an average standard deviation of 3.18 so that based on the Cohen formula, the value of is = 1.77. This value is more significant than 0.8, so according to the criteria set by Laken, the effect size of GC in Inorganic Chemistry lectures is large. This means that the use of GC as an LMS is very useful in learning inorganic chemistry. This is in line with the students' recommendations for GC's benefit as an LMS for other lessons. Another indication is that no student (0%) is unsatisfied or unsatisfied with recommended GC to be used in another class, but 67.5% delighted.

Data from the questionnaire about students' perceptions of GC shows a positive perception in all five parts. Positive perception can be seen from the average value of scale options. The first part is about GC accessibility. There are five scales used: low, fair, moderate, reasonable, and excellent with a scale of 1-5. Plate 5 (excellent) has the highest average value, followed by reasonable, middle, fair, and low. The same thing happened to the second criterion, which is GC accessibility. The average percentage ranging from the largest to the smallest was 42.875%, 31.875%, 21.25%, 3.75%, and 1.25%. Part 3 is the student's perception of communication and Interaction through GC. There are five descriptors asked the students, then answered that communication and Interaction through GC persistent (44.6%), frequently (36%), occasionally (13%), rarely (5.5%), and never (1.5%). Part 4 of the students' perceptions of lesson delivery by the teacher through GC with five descriptors with the largest mean was 52% (very frequently), followed by 34.5% (often), then 10% (occasionally), 2% rarely, and 1.5% (never). The last is the fifth part of the questionnaire to uncover students' perceptions of their satisfaction in studying Inorganic Chemistry through GC. There are three descriptors asked, the first, whether students recommend GS to be used in another lesson; the second GC became the first choice as LMS, the third GC as a learning motivation. The mean percentage of students for the three descriptors was very satisfied (62.5%), satisfied (29.833%), neutral (3.333%), unsatisfied (1.666%), very unsatisfied (1.666%).

Disscussion

A study identified that perceptual truth is influenced by humor (Bitterly & Schweitzer, 2019). The results of this study on the accessibility of GC, such as the conclusion of a qualitative survey of instructors and students at two universities, indicate that students have access to online learning for independent study with online courses (Kumar et al., 2020; Rani & Beutlin, 2020). Technology in course design, including a section with frequently asked questions and a helpful resource page. Several methods of contrails transmission should be designed into online courses, including synchronous activities and learning and compressed videos, slide presentations, video lectures, site viewing, and several methods of communication, such as e-mail, chat rooms, and webcam conversations (Siahaan, 2021; Suhroh & Cahyono, 2020). In contrast to the reverse class recommended for high-technical classes such as complexity theory, GC was the highest at 45.0% as a learning tool. The advantages of GC are social media, an evaluation system, a learning tool, and a means of communication (Hidayati et al., 2020; Purba, 2021). These descriptors may also be available in other LMS such as Moodle, which has chat facilities and evaluation tools. For this reason, further research is needed to compare various LMS features (Al-Maroof & Al-Emran, 2018; Santosa et al., 2020). The interaction between students and lecturers shows social intimacy, which can be influenced by teaching strategies, feedback, and classroom facilities (Dukuzumuremyi & Siklander, 2018; Mu'minah & Gaffar, 2020). By using GC, students have the freedom to ask any questions to the teacher without being disturbed by any situation in the classroom. It can be seen from 47.5% of students' perceptions that they feel free to use the GC chat facility. Students feel comfortable, and teachers become more enthusiastic in delivering lessons.

The comparison of trained and untrained lecturers in LMS has been analyzed (Chow, J., Tse & Armatas, 2018). It shows that trained lecturers carry out LMS activities higher than untrained lecturers. When delivering teaching materials, trained lecturers tend to use more assessment tools but less content than unqualified teachers. This result may be due to online learning adopting a more innovative approach to lesson delivery and education. Teachers should be familiar with GC before using it as an LMS. The Inorganic Chemistry content has been well prepared and uploaded to the GC system and making it accessible for students to download or learn from the system. The organizational perspective of using LMS and its correlation with student satisfaction has been carried out (Akhmalia et al., 2018; Bervell et al., 2020; Sumardi et al., 2021). It was found that the use of varying LMS was high but low in the correlation between service and satisfaction. Course content, course size, and presence of instructors or teachers are significant with LMS use. Students have many LMS options; maybe they are experiencing someone else or maybe not at all. It needs to be clarified in future work. The effect size is significant because it allows the

researcher to see differences between or between groups and compare the current work results with those of previous ones.

4. CONCLUSION

The result showed that GC was excellent at accessing the teaching material, handout, and PowerPoint, while the system was easy to understand. It is reasonably easy to access the video, receiving the assignment, sending the assignment (project), and navigate the system. The students' opinion GC privilege was excellent in its ability to send the task on time, as social interaction media, and receive feedback from the teacher. GC also privileges good as a helpful evaluating system and having a good quality of learning. Students' opinions regarding communication and Interaction through GC during seven weeks lesson that lecturers build interaction with students frequently, and very often teacher very enthusiastic deliver the lecture.

5. ACKNOWLEDGEMENT

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