PERIÓDICO TCHÊ QUÍMICA

ARTIGO ORIGINAL

IMPLEMENTAÇÃO DE WEBINARS EM MODELOS DE APRENDIZAGEM COMBINADA PARA MELHORAR A MOTIVAÇÃO E RESULTADOS NA APRENDIZAGEM DO ESTUDO DO SISTEMA ESQUELETAL HUMANO

IMPLEMENTATION OF WEBINARS IN BLENDED LEARNING MODELS TO IMPROVE MOTIVATION AND LEARNING OUTCOMES OF THE STUDY OF HUMAN SKELETAL SYSTEM

PENGARUH MODEL BLENDED LEARNING MELALUI APLIKASI WEBINAR DAN MOTIVASI TEHADAP HASIL BELAJAR SISWA PADA MATERI SISTEM RANGKA MANUSIA

ANDRINI, Vera Septi[1]; MATSUN[2]; MADURETNO, Tri Wahyuni[3]

[1,3]STKIP PGRI Nganjuk, East Java, Indonesia

[2]IKIP PGRI Pontianak, Indonesia

* Corresponding author
e-mail: vera @stkipnganjuk.ac.id

RESUMO

A existência da pandemia de Covid-19 em 2020 teve um impacto devastador na educação. A interação entre professores e alunos normalmente não pode ser feita. Com base nisso, as inovações na educação devem continuar sendo realizadas para melhorar a qualidade da aprendizagem. Esse estudo objetivou descobrir modelos de aprendizagem combinada por meio de aplicativos de webinar e motivação sobre os resultados da aprendizagem do aluno no curso Sistema Esquelético Humano. O estudo foi realizado na Associação de Professores do Ensino Médio da República da Indonésia 2 Nganjuk Regency, Java Oriental, Indonésia, na classe 1 do ano acadêmico 2019/2020, em disciplinas de ciências com material no Sistema de Ordem Humana. O número de amostras foi de 83 alunos, divididos em 42 alunos da turma experimental e 41 da classe controle. A classe experimental usa o modelo de aprendizado combinado utilizando um aplicativo de webinar, enquanto a classe de controle usa a ajuda dos módulos eletrônicos. Os métodos de coleta de dados a serem utilizados são observação, questionários e testes. As técnicas de análise de dados utilizaram o Two Way Anova. Os resultados mostraram que (1) houve diferenças nos resultados da aprendizagem dos alunos no curso do Sistema Esquelético Humano com base no modelo de aprendizagem combinada por meio de aplicativos de webinar, (2) houve diferentes resultados na aprendizagem dos alunos no curso do Sistema Esquelético Humano com base na alta motivação para a aprendizagem e baixa motivação para o aprendizado, (3) há interação entre os modelos de aprendizagem combinada por meio de aplicativos de webinar e motivação nos resultados de aprendizagem dos alunos no curso Sistema Esquelético Humano. A novidade deste resultado é a aplicação de webinar no processo de aprendizagem e resultados na forma de produtos de mídia de aprendizagem holográficos desenvolvidos no sistema esquelético humano. Através da mídia holográfica, o material parece mais real e se assemelha à sua forma original. Os alunos podem aprender sistemas esqueléticos através de imagens holográficas de uma variedade de perspectivas diferentes. Os alunos são mais motivados por projetos apresentados pelos professores, porque os projetos fornecidos são interessantes e capazes de melhorar as habilidades. Os alunos podem estudar material tanto em termos de ciências físicas quanto biológicas.

Palavras-chave: *aprendizagem combinada, motivação, seminários on-line, resultados de aprendizagem, módulos eletrônicos, hologramas*

ABSTRACT

The existence of the Covid-19 pandemic in 2020 has had a devastating impact on education. Interaction between teachers and students typically cannot be done. Based on this, innovations in education must continue to be done to improve the quality of learning. This study aimed to find out blended learning models through webinar applications and motivation on student learning outcomes in the Human Skeletal System course. The study was conducted at the Vocational High School Teachers Association of the Republic of Indonesia 2 Nganjuk Regency, East Java, Indonesia, and held in class 1 of the academic year 2019/2020 on science subjects with material on

Periódico Tchê Química. ISSN 2179-0302. (2020); vol.17 (n°36)
Downloaded from www.periodico.tchequimica.com

402

DOI: 10.52571/PTQ.v17.n36.2020.417_Periodico36_pgs_402_414.pdf

the Human Order System. The number of samples was 83 students divided into 42 experimental class students and 41 control class students. The experimental class uses the blended learning model by utilizing a webinar application, while the control class uses the help of e-modules. Data collection methods that be used are observation, questionnaires, and tests. Data analysis techniques used Two Way Anova. The results showed that (1) there were differences in student learning outcomes in the Human Skeletal System course based on the blended learning model through webinar applications, (2) there were different student learning outcomes in the Human Skeletal System course based on high learning motivation and low learning motivation, (3) there is an interaction between blended learning models through webinar applications and motivation on students' learning outcomes in the Human Skeletal System course. The novelty of this result is the application of webinars in the learning process and outcomes in the form of the holographic learning media products developed on the human skeletal system. Through holographic media, the material looks more real and resembles its original form. Students can learn skeletal systems through holographic images from a variety of different perspectives. Students are more motivated through projects given by teachers because the projects provided are engaging and able to improve skills. Students can study material both in terms of physical and biological sciences.

Keywords: *blended learning, motivation, webinars, learning outcomes, e-modules, holograms*

ABSTRAK

Adanya pandemi Covid-19 pada tahun 2020 ini memberikan dampak yang buruk khususnya dalam bidang pendidikan. Interaksi antara guru dan siswa secara normal tidak bisa dilakukan. Berdasarkan hal tersebut, inovasi dalam pendidikan harus terus dilakukan agar mampu meningkatkan kualitas pembelajaran. Tujuan penelitian ini adalah mengetahui model blended learning melalui aplikasi webinar dan motivasi terhadap hasil belajar siswa pada mata kuliah Sistem Rangka Manusia. Penelitian dilaksanakan di Sekolah Menengah Kejuruan Persatuan Guru Republik Indonesia 2 Kabupaten Nganjuk Jawa Timur Indonesia. Dilaksanakan pada kelas 1 tahun akademik 2019/2020 pada mata pelajaran IPA dengan materi Sistem Rangka Manusia. Jumlah sampel sebesar 83 siswa terbagi menjadi 42 siswa kelas eksperimen dan 41 siswa kelas kontrol. Kelas eksperimen menggunakan model pembelajaran blended learning dengan memanfaatkan aplikasi webinar sedangkan kelas kontrol menggunakan bantuan e-module. Metode pengumpulan data menggunakan observasi, angket, dan tes. Teknik analisis data menggunakan Two Way Anova. Hasil penelitian menunjukkan bahwa (1) ada perbedaan hasil belajar siswa pada mata kuliah Sistem Rangka Manusia berdasarkan model blended learning melalui aplikasi webinar, (2) ada berbedaan hasil belajar siswa pada mata kuliah Sistem Rangka Manusia berdasarkan motivasi belajar tinggi dan motivasi belajar rendah, (3) ada interaksi antara model blended learning melalui aplikasi webinar dan motivasi terhadap hasil belajar siswa pada mata kuliah Sistem Rangka Manusia. Kebaharuan dalam penelitian ini adalah penerapan webinar dalam proses pembelajaran dan luaran berupa produk media pembelajaran hologram yang dikembangkan pada materi Sistem Rangka Manusia. Melalui media hologram, materi terlihat lebih riil dan menyerupai bentuk aslinya. Siswa dapat belajar sistem rangka melalui gambar hologram dari berbagai perspektif yang berbeda. Siswa lebih termotivasi melalui proyek yang diberikan guru karena proyek yang diberikan menarik dan mampu meningkatkan keterampilan. Siswa bisa mengkaji materi baik ditinjau dari keilmuan fisika maupun biologi.

Kata kunci: *blended learning, motivasi, webinar, hasil belajar, e-module, hologram*

1. INTRODUCTION:

Coronavirus outbreak or Covid-19 that struck in this part of the world changed the order of people's lives. Among the main changes that occur is the involvement of technology in the world of education. The impact of COVID-19 on technology for teaching and learning is felt, especially now that distance learning systems are an option so that teachers and students can reduce the spread of the virus. The Indonesian Minister of Education said, with software tools were various types that had been partitioned because they were constrained with classrooms and others, now they could innovate because they could be more personalized, more segmented learning with multimedia. So it is not just the teacher sitting in front of students but with a variety of other tools, digital video chalkboard, and others (Lia, 2020). Therefore, the need for innovation and always actively follows existing developments both from teachers, students, and parents so that the learning process continues to run smoothly and quality.

Other problems in education in Indonesia, when viewed from the learning outcomes, the value of the National Examination (UN) for the SMA / SMK level in 2018 has decreased significantly. National Education Standards Agency, the decline in grades occurs in students in 50% of Indonesia schools. Specifically for the East Java Education Office, the UN level for SMA / SMK / MA equivalent with scores below 55 in

Periódico Tchê Química. ISSN 2179-0302. (2020); vol.17 (n°36)
Downloaded from www.periodico.tchequimica.com

403

2018 reached 78.88% while in 2017 it was only 55.41% ((BNSP), 2018).

Based on data from the Ministry of Education and Culture, two factors cause a decline in the average UN score. First, the change in norms. In 2018, the standard of questions is made higher than in 2017. The question leads to the type of reasoning (HOTS). Second, it changed the exam mode from the Paper and Pencil-based National Examination (UNKP) to the Computer-Based National Examination (UNBK). The implementation of UNBK is not evenly distributed throughout Indonesia due to infrastructure problems, internet network problems, and teachers and students are not accustomed to using computers.

Based on data from interviews with teachers at the Republic of Indonesia 2 Nganjuk Vocational Teachers Middle School (SMK PGRI 2 Nganjuk), East Java Indonesia, the decline in UN scores inseparable from the application of the learning process that lacks integrating technology. The learning process generally uses lectures, discussions, practices, and presentations. Learning models that are still teacher-centered impact the lack of increased ability of the High Order Thinking Skill. The survey results show that only 40% of teachers can apply Information and Communication Technology (ICT). The percentage of teachers who have not yet used ICT is dominated by senior teachers over the age of 50 years (Henny, R. 2019)

Based on the problems outlined above, it is the need to improve the learning process for teachers and the application of innovative technology-based learning. The blended learning model accommodates innovative learning concepts based on online and offline (Shih, 2010). Blended learning is learning that is conventionally done in the classroom, combined with online learning both independently and collaboratively, using the information and the communication technology infrastructure (Quevedo, 2011). The model commonly used in blended learning is Web-Centric Course. It is the use of the internet that combines distance learning and face-to-face (conventional). Some materials are delivered via the internet and some through face-to-face. In this model, educators can provide instructions for the students to learn subject matter through the web that has been made. Students are also given directions to look for other sources from relevant websites. In face to face, students and educators more discussion about the findings of material that have been learned through the internet (Quevedo, 2011).

The advantage of this model is that it allows freedom of learning to be done anytime and anywhere, increases mastery of digital literacy, and teachers can control learning outside of school hours (Dangwal and Lata, 2017; Kim and Yoon, 2014). In the implementation of blended learning, electronic media is supported, such as websites, smartphones, video streaming, synchronous, and asynchronous audio communication.

Thus, there is a need to improve the quality and learning outcomes by applying more innovative learning models and the need to increase student motivation. This study aimed to determine the effect of blended learning and motivation learning models on learning outcomes. The use of blended learning in this study was accompanied by the use of webinar applications.

2. MATERIALS AND METHODS:

The research design used in the study was quasi-experimental. The study was intended to determine the effect of the blended learning model through webinar applications and motivation on student learning outcomes in the Human Framework System course. The study used an experimental class and a control class. An experimental class is a class that is treated using a blended learning model through a webinar application, and a control class is a class that is treated using an e-module. Independent variables in this study are blended learning models through webinar applications and the students' learning motivation, while the dependent variable in this study is the students' learning outcomes.

In this study, the blended learning model was combined with a web-based application, a webinar. Webinars are face-to-face meetings conducted online through the internet media, which can be attended by many people from different locations and on agreed-upon actions via video or chat (Mohamad et al., 2017). The reason for using webinars is that teachers can interact and do tutoring outside school hours (Amhag, 2017). When at home, if there are students who have difficulty learning, it can be done online guidance through the webinar application.

The study was conducted at SMK PGRI 2 Nganjuk, East Java, Indonesia, with a sample of 83 students divided into 42 experimental class students and 41 control class students taking science subjects. All students who agreed to be the sample in this study were grade 1 students with an average age of 16 years, consisting of 34 male and 49 female students. Data collection

Periódico Tchê Química. ISSN 2179-0302. (2020); vol.17 (n°36)
Downloaded from www.periodico.tchequimica.com

404

methods used observation, questionnaires, and tests (APPENDIX 1). Data analysis techniques used Two Way Anova. This analysis is used to compare the average difference between groups that have been divided into two variables. The research hypotheses proposed are: (1) there are differences in student learning outcomes in the Human Skeletal System course based on the blended learning model through the webinar application, (2) there are different students' learning outcomes in the Human Skeletal System course based on the high learning motivation and the low learning motivation, and (3) there is an interaction between blended learning models through webinar applications and motivation on students' learning outcomes in the Human Skeletal System course.

3. RESULTS AND DISCUSSION:

The impact of motivation on student learning outcomes was also examined. The students who have high interest and motivation to learn are usually characterized by good academic grades, have structured learning habits, have a good understanding of each reading (Black and Allen, 2017), have high self-efficacy, and have high learning performance (Howard, Tang, and Austin, 2015). Students who have low interest and motivation to learn usually have a tendency to withdraw, not go to school, drop out of school, have relatively high anxiety and have low academic results (Sturges, Maurer, Allen, Gatch, and Shankar, 2016). The motivation of students of SMK PGRI 2 Nganjuk, East Java, Indonesia, is relatively low, which can be seen from the number of students who do not attend subjects, especially science.

Empirical data based on Table 1 shows that the number of students who were absent in a period of two consecutive academic years is quite high. This indicates that the interest and motivation of students for learning are still low because attendance is one form of student participation in the classroom's learning process (Sha, Schunn, Bathgate, and Ben-Eliyahu, 2016). The results of the influence test between variables can be seen in Table 2.

3.1. First Hypothesis: The Effect of Learning Models on Learning Outcomes in the Human Skeletal System Course

The first research objective was to test for the differences in learning outcomes courses Human Skeletal System, taught using a model blended learning through webinar applications and e-module learning. The first hypothesis proposed is there are differences in student learning outcomes in the Human Skeleton System course based on the blended learning model through a webinar application.

Based on the Two Way Anova analysis results in Table 2, the calculated F value of 25.109 with Sig. 0.040. It is less than the significance level of 0.05. Thus it can be concluded that hologram was rejected. This matter means there are differences in student learning outcomes in the Human Skeleton System course based on the blended learning model through a webinar application. Webinars provide a student-centered approach to learning with technology and can improve communication. The results show a positive increase in students' knowledge and skills in the learning process (Lieser, Taf, and Murphy-Hagan, 2018).

Based on Table 3, the learning process is categorized into 2, namely using a blended learning model through webinars and the learning process using e-modules. The model of blended learning through a webinar called Synchronous E-Learning is a learning process through direct communication carried out through computer mediation and online services (in a network). Through webinar media, the students and the teachers can carry out the learning process in real-time and on a scheduled basis. This method is very familiar to students and teachers because they can be face to face (virtually) in the classroom so that communication can take place more effectively. If students have difficulty learning, they can directly ask the teacher. Through the blended learning model, some materials are delivered via the internet and some through face-to-face. In this model, the educators can provide instructions to students to learn subject matter through the web that has been made. The students are also given directions to look for other sources from relevant websites. In face to face, the students and the educators are more discussions about the findings of material that has been learned through the internet (Albhnsawy and Aliweh, 2016).

In the learning process, webinars help communication between the teachers and the students. The analysis shows that the webinar is able (1) the effective cost because it does not need transportation to the seminar venue, (2) is very flexible, can be done anywhere and anytime, (3) can interact with many people without face to face. The use of e-learning based on webinars greatly supports the implementation of learning, students' skills in using computer technology in learning

Periódico Tchê Química. ISSN 2179-0302. (2020); vol.17 (n°36)
Downloaded from www.periodico.tchequimica.com
405

increases, and supports the concept of online lectures (Purwandini, 2017). The utilization of ICT such as LMS and webinars, effectively improves the teachers skills and students skills. Both teachers and students can discuss and communicate online and provide teachers with convenience in giving feedback (Polanco-Bueno, 2013).

It contrasts with the learning process through the E-Module, or it can be called Asynchronous E-Learning. In its implementation, communication occurs indirectly and unscheduled. The students can choose reference material from the various sources or according to what the teacher prepares. Because the teachers and the students cannot face to face directly, the communication process becomes slower. Even the evaluation process cannot be done directly like Synchronous E-Learning (Perveen, 2016).

Figure 1 shows an example of a simple hologram application project by converting 2D images into 3D. In this project, students can learn two materials in terms of biological and physical scientific aspects.
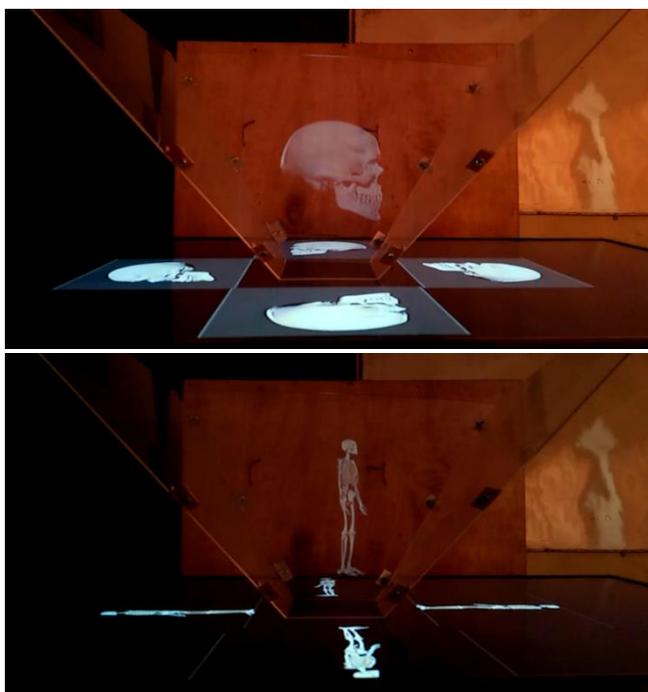

Figure 1. *Example of a Hologram Making Project on Material for Human Skeleton Systems (Source: The Author)*

In the concept of physics, a hologram is a photography technology that records the light scattered from an object and presents it in a 3-dimensional form. This hologram is formed from a combination of 2 coherent rays of light in microscopic form. In the physical concept, the hologram applies the diffraction principle and the interference that is a wave phenomenon (Figure 2).
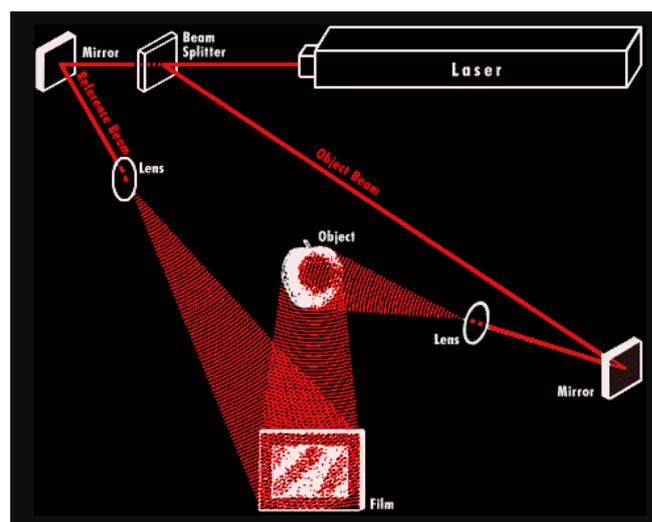

Figure 2. *Illustration of Hologram Transmission Working Principle (Source: web.mit.edu)*

Based on Figure 2, the hologram is formed due to the collision between the reference beam and the object beam on the holographic surface. In principle, the beam splitter is a glass that is half mirror and half lens that functions to separate the beam into two, namely the reference beam and object. The reference beam is directed towards the holographic surface, while the object beam is directed towards the object and reflected toward the holographic surface. Mixing the reference beam and the object beam on the holographic surface can produce reconstructed images that can be seen on the holographic side that is not exposed to light or the opposite side of the holographic surface exposed to light. After processing, the appearance of objects will look different from various angles (3600) (Capuno, 2016; Husain, 2015).

Biologically, the material of the Human Skeleton System can be studied to be more interesting because the appearance of the image resembles its original and more real form. The light reaching the eye of the observer, which comes from the image reconstructed from a hologram, is the same as the original object. The observer can see the holographic image both by parallax, see depth, and see from various perspectives (giving the observer a 360^0 view of the object). Holograms can present items virtually to effectively support the distance learning process (Kalansooriya, Marasinghe, and Bandara, 2015). Utilization of 3D holographic technology by utilizing the working principle of Holographic reflection makes the learning process more exciting and can increase

Periódico Tchê Química. ISSN 2179-0302. (2020); vol.17 (n°36)
Downloaded from www.periodico.tchequimica.com

406

the students' motivation (Listyorini and Riadi, 2016).

3.2. Second Hypothesis: The effect of the high learning motivation and the low learning motivation on students' learning outcomes in the Human Skeletal System course

The second research objective is to examine the differences in learning outcomes of courses Human Skeletal System in the students who have high learning motivation and have low learning motivation. The hypothesis is that there are different students' learning outcomes in the Human Skeletal System course based on high learning motivation and low learning motivation.

Based on the Two Way Anova analysis results in Table 2, the calculated F value was 4.364 with the Sig. of 0,000. Sig value This is less than the significance level of 0.05. Thus it can be concluded that hologram was rejected. This matter means there are different student learning outcomes in the Human Skeletal System course based on high learning motivation and low learning motivation.

Based on Figure 3, students who have the motivation to learn to tend to pay attention to the duration of learning activities, frequency of study, persistence, grit, tenacity, and ability to face obstacles and difficulties, devotion and sacrifice, the level of aspiration, the level of achievement/product qualifications (outputs), and the direction of learning attitude. The students who have high learning motivation tend to be involved in all learning activities intensively, focused, and diligently during the learning process. Learning motivation is one factor that can distinguish students who maximize their learning potential from students who lack academic achievement. Also, from being one of the factors that determine the direction of attitude, the amount of willingness, and perseverance of student behavior (Keller, 2016), learning motivation refers to expectations and values. The expectation shows that the students be able to do the assignment that be given, and the value shows the students' conviction strongly to successful in the study (Maduretno, Sarwanto, and Sunarno, 2016; Riconscente, 2014).

The duration aspect has an average class score of 2.87 (good category). The duration is the period of the learning process carried out. During the process, the students show a tendency to pay attention to the material provided. In the aspect of learning frequency, it has a score of 3.11 (very good category). The frequency shows the intensity of the students in learning. The more activities that are given, the more active the students are in following them. Even at this stage, it does not indicate boredom. In the aspect of persistence, it has a score of 2.9 (good category). This persistence is an act of the students who volunteer to achieve maximum results despite experiencing failures and difficulties.

In the aspect of the devotion is 2.79 (good category). Devotion is a sacrifice made by the students in achieving goals. Actively and voluntarily, the students make various efforts to solve the problems given by the teacher. It is starting from finding references, doing projects, and doing an independent practicum. In the aspect of the tenacity is 2.85 (good category). Students tenacity can be seen from their ability and patience in facing the challenges and difficulties that are given. In the aspect of the aspirations' level is 3.24 (very good category). Aspirations of the students showed significant results and were marked by the enthusiasm in participating in the learning process and the benefits obtained from these activities. In the aspect of the qualification level is 3.05 (very good category). This level of qualification is measured from the products achieved by students through a given project. The product shows the quality and is following the learning objectives. In the aspect of attitude towards 2,75 (good category). Students who have high learning motivation tend to be involved in all learning activities intensively, focused, and diligently during the learning process. So in this stage, the direction of student attitudes shows positive results (Ricardo and Meilani, 2017). The importance of learning motivation as a psychological aspect of students that has a positive and significant influence on learning outcomes. In increasing the students' aspirations, the teachers and the parents need to recognize the aspirations/ideals that students have and develop programs or various activities to facilitate students aspirations (Suardi, 2018).

3.3. Third Hypothesis: The interaction between blended learning models through webinar applications and motivation on students' learning outcomes in the Human Skeletal System course

The third research objective was to examine the interaction between learning models with learning motivation towards learning outcomes of courses Human Skeletal System. The hypothesis put forward was there is an interaction between blended learning models through webinar applications and motivation on

Periódico Tchê Química. ISSN 2179-0302. (2020); vol.17 (n°36)
Downloaded from www.periodico.tchequimica.com

407

students' learning outcomes in the Human Skeletal System course.

Based on the Two Way Anova analysis results in Table 2, the calculated F value was 4.710 with the Sig. 0.033. Sig value. This is less than the significance level of 0.05. Thus, it can be concluded that the hologram was rejected. This matter means there is an interaction between blended learning models through webinar applications and motivation on students' learning outcomes in the Human Skeletal System material. Figure 4 shows the misalignment of lines between variables. This means there is an interaction between learning models and motivation on learning outcomes.

Table 4 shows that the mean value of learning outcomes with blended learning through a webinar (Synchronous E-Learning) is higher than the learning process using E-Module (Asynchronous E-Learning). The mean learning outcomes using webinars on aspects of high motivation ability is 89.36 higher than learning outcomes using E-Module on aspects of the high motivation of 78.85. This applies to aspects of webinars and E-modules on aspects of low motivation. The application of webinars in descriptive synchronous learning effectively promotes students' knowledge than asynchronous learning. Descriptively, it seems that the students' satisfaction in synchronous webinars is higher than asynchronous online instruction (Ebner and Gegenfurtner, 2019).

4. CONCLUSIONS:

The blended learning model through webinar applications proved to be effective in improving learning outcomes in the material of the Human Framework System. The results of the research hypothesis test showed that (1) First Hypothesis: there are differences in student learning outcomes in the Human Skills System course based on blended learning models through webinar applications. This is evidenced by the Sig value of 0.040; (1) Second Hypothesis: there are different student learning outcomes in the course of the Human Framework System based on high learning motivation and low learning motivation. This is evidenced by the value of Sig. amounting to 0,000; (3) there is an interaction between blended learning models through webinar applications and motivation on student learning outcomes in the Human Skills System course. This is evidenced by the value of Sig. in the amount of 0.033. Mean learning outcomes using webinars on the aspect of high motivation ability is 89.36 higher

than on learning outcomes using the E-Module on the high motivation aspect of 78.85. Students who have high learning motivation are more active than students who have low learning motivation. As a result, highly motivated students have better learning outcomes. Motivation aspects are measured based on eight indicators, namely aspects of the duration of learning activities, frequency of activities, persistence, fortitude, tenacity, and ability to deal with obstacles and difficulties, devotion and sacrifice, the level of aspiration, the level of achievement/product qualifications (output), and the direction of learning attitudes. The novelty in this research was the product output in making holograms as learning media in the material of the Human Order System. This project can make students more active. Students find learning more engaging and can apply concepts both physically and biologically through the holographic media. In further research, teachers, students, and even parents need to adapt to all forms of change in education, especially those related to technology. So that in the future, it will be better prepared and able to keep up with developments.

5. REFERENCES:

1. (BNSP), N. E. S. A. (2018). National Examination (UN) Results for Improving Education Quality. Retrieved May 8, 2018, from https://www.kemdikbud.go.id/main/blog/2018/05/hasil-un-for-represent-quality-ducation

2. Albhnsawy, A. A., and Aliweh, A. M. (2016). Enhancing Student Teachers' Teaching Skills through a Blended Learning Approach. *International Journal of Higher Education*, *5*(3), 131–136.

3. Amhag, L. (2017). Mobile-Assisted seamless learning activities in higher distance education. *International Journal of Higher Education; 3*, *6*.

4. Capuno, F. T. (2016). The use of alternative animation and 3-d model in teaching photosynthesis. *International Journal Of Biology Education*, *5*(1).

5. Dangwal, K. L., and Lata, K. (2017). Blended learning: An innovative approach. *Universal Journal of Educational Research*, *5*(1), 129–136.

6. Ebner, C., and Gegenfurtner, A. (2019). Learning and satisfaction in webinar, online, and face-to-face instruction: a meta-analysis. *Frontiers in Education*, *4*, 92.

Periódico Tchê Química. ISSN 2179-0302. (2020); vol.17 (n°36)
Downloaded from www.periodico.tchequimica.com

408

Frontiers.

7. Husain, A. N. (2015). Holographic Principle of Work. Retrieved May 29, 2020, from https://www.insinyoer.com/principles-work-holograms/

8. Kalansooriya, P., Marasinghe, A., and Bandara, K. (2015). Assessing the Applicability of 3D Holographic Technology as an Enhanced Technology for Distance Learning. *IAFOR Journal of Education*.

9. Keller, J. M. (2016). Motivation, learning, and technology: Applying the ARCS-V motivation model. *Participatory Educational Research*, *3*(2), 1–15.

10. Kim, H., and Yoon, M. (2014). Adopting smartphone-based blended learning: An Experimental study of the implementation of Kakao-Talk and Mocafe. *Multimedia-Assisted Language Learning*, *17*(2), 86–111.

11. Lia, H. (2020). No Title. Retrieved May 30, 2020, from IDN TIMES website: https://www.idntimes.com/news/indonesia/lia-hutasoit-1/mendikbud-ada-3-per change-education-kibat-pandemik-virus-corona/3

12. Lieser, P., Taf, S. D., and Murphy-Hagan, A. (2018). The Webinar Integration Tool: A Framework for Promoting Active Learning in Blended Environments. *Journal of Interactive Media in Education*, *2018*(1).

13. Listyorini, T., and Riadi, A. A. (2016). 3d Hologram as Interactive Media Introduction to Dinosaur Antiquities. *SNATIVE Proceedings*, 25–32.

14. Maduretno, T. W., Sarwanto, S., and Sunarno, W. (2016). Pembelajaran IPA Dengan Pendekatan Saintifik Menggunakan Model Learning Cycle Dan Discovery Learning Ditinjau Dari Aktivitas Dan Motivasi Belajar Siswa Terhadap Prestasi Belajar. *Jurnal Pendidikan Fisika Dan Keilmuan (JPFK)*, *2*(1), 1–11.

15. Mohamad, A. M., Jaafar, M. Z., Ishar, N. I. M., Adnan, A., Aziz, N. A., Ramli, M. Z., … Azman, J. J. (2017). Using Integrated Technologies for Lifelong Learning: Case Study of Doctorate Support Group Webinars. *Advanced Science Letters*, *23*(8), 7809–7812.

16. Perveen, A. (2016). Synchronous and asynchronous e-language learning: A case study of virtual university of Pakistan. *Open Praxis*, *8*(1), 21–39.

17. Polanco-Bueno, R. (2013). Blogs, Webinars and Significant Learning: A Case Report on a Teacher Training Program for College Teachers. *Higher Learning Research Communications*, *3*(1), 56–67.

18. Pratama, H., and Prastyaningrum, I. (2019). Effectiveness of the use of Integrated Project Based Learning model, Telegram messenger, and plagiarism checker on learning outcomes. *Journal of Physics: Conference Series*, *1171*(1), 12033. IOP Publishing.

19. Purwandini, I. (2017). Organizing Elearning Using Wiziq in Learning Parenting in the Community of Professional Mother Institute. *Journal of Computer Science and Technology*, *2*(2), 102–107.

20. Quevedo, A. (2011). Blended-learning Implementation in Undergraduate Teacher's Formation Courses: Difficulties from the Students' Point of View. *International Journal of Technology, Knowledge and Society*, *7*(2).

21. Ricardo, R., and Meilani, R. I. (2017). Impak minat dan motivasi belajar terhadap hasil belajar siswa. *Jurnal Pendidikan Manajemen Perkantoran (JPManper)*, *2*(2), 188–201.

22. Riconscente, M. M. (2014). Effects of perceived teacher practices on Latino high school students' interest, self-efficacy, and achievement in mathematics. *The Journal of Experimental Education*, *82*(1), 51–73.

23. Shih, R.-C. (2010). Blended learning using video-based blogs: Public speaking for English as a second language students. *Australasian Journal of Educational Technology*, *26*(6).

24. Suardi, M. (2018). *Belajar and pembelajaran*. Deepublish.

Periódico Tchê Química. ISSN 2179-0302. (2020); vol.17 (n°36)
Downloaded from www.periodico.tchequimica.com

409

Table 1. *Number of Students Not Attending Teaching and Learning Activities in 2 Academic Years*

Class	School year	Total students	Average Number of Students Absent	Percentage
X-1	2018/2019	42	13	31%
X-2	2019/2020	41	16	29%

Table 2. *Variable Influence Test Results (Tests of Between-Subjects Effect - Dependent variable: Learning Outcome)*

Source	df	Mean Square	F	Sig
Corrected Model	3	1471,778	11,675	,000
Intercept	1	503278,789	3992,366	,000
Learning Model	1	550,173	4,364	,040
Learning Motivation	1	3165,202	25,109	,000
Learning Model *Learning Motivation	1	593,706	4,710	,033
Total	83			
Corrected Total	82			

a. R squared = ,307 (Adjusted R Square = ,281);
dF=Degrees of freedom, F= one way analysis of co-variance, Sig=significance SS

Table 3. *Learning Process Using Blended Learning Models through Webinars and Using E-Modules*

Model	Media	Characteristic	Advantages	Weakness
Synchronous E-Learning	Live Webinar	• Real-time • Scheduled • Collective and can be a collaborative learning • Presenting virtual learning • Content requires instructors • The need for direct communication between the educators and the students	• Familiar with students because learning is carried out directly on a virtual basis • The presence of instructors is significant in the learning process • Communication between the educators and the students becomes faster • The evaluation process can be done directly	• Additional costs required • Requires adequate infrastructure such as internet access speed and bandwidth •
Asynchronous E-Learning	E-Module and Email	• Interaction cannot occur continuously • Unscheduled • Self-learning (sometimes collaborative) • Content stands alone	• Students can determine their own learning needs and the desired reference • Having an instructor can guarantee the quality of the learning process	• Communication between the students is slower • The evaluation process cannot be done directly

Periódico Tchê Química. ISSN 2179-0302. (2020); vol.17 (n°36)
Downloaded from www.periodico.tchequimica.com

410

Table 4. *Mean values in the interaction of Learning Models * Learning Motivation*

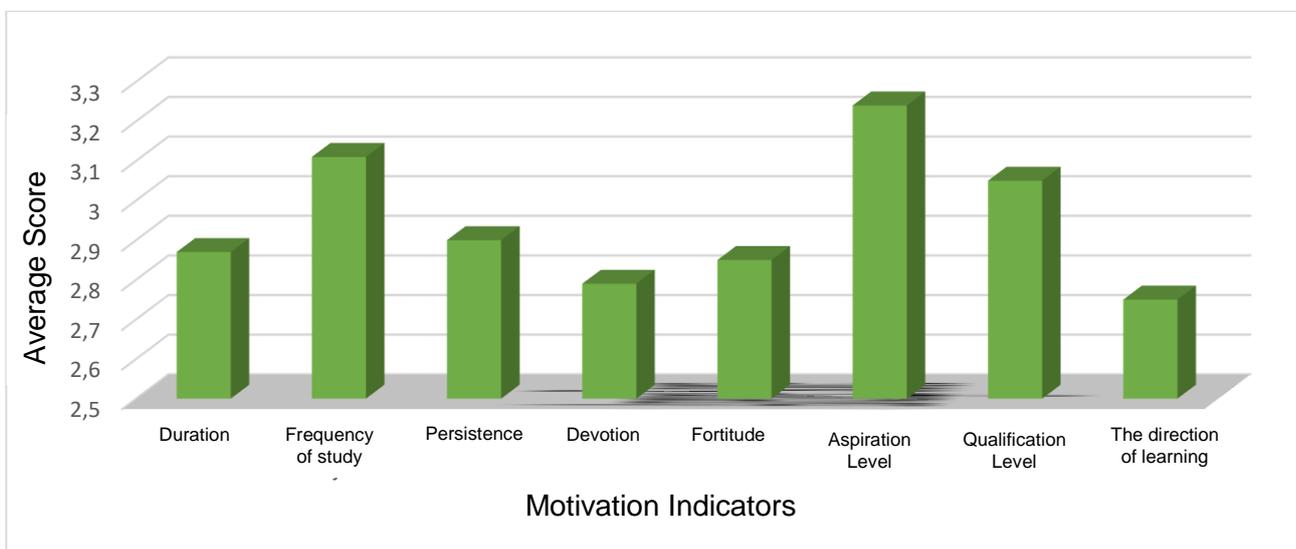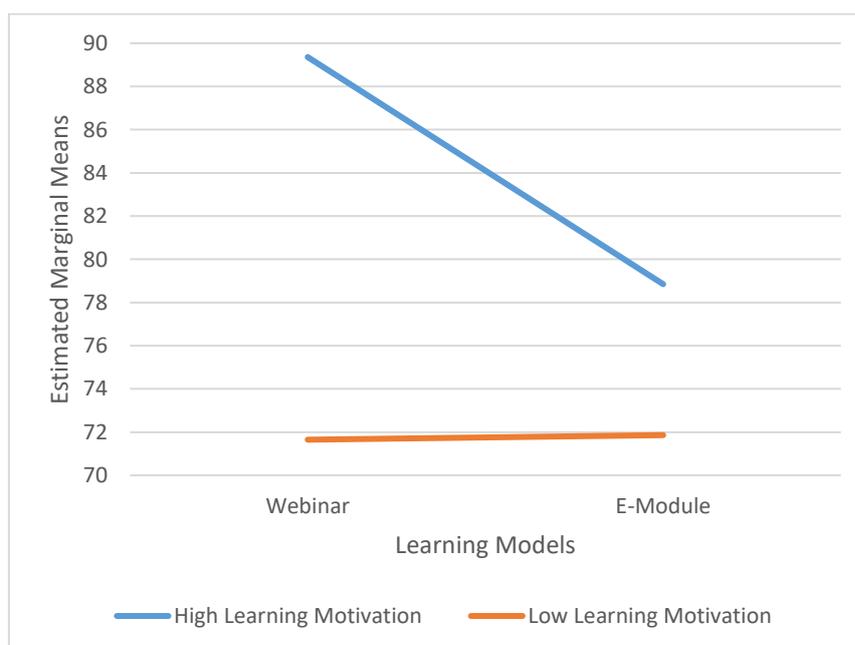| Dependent Variable	Learning model	Model_Learning * Motivation_Learning	
		Motivation to learn	**The mean (%)**
Learning outcomes	Webinar	High	89.36
		Low	71.65
	E-Module	High	78.85
		Low	71.86

Figure 3. *Average Score of Learning Motivation Indicators*

Figure 4. *Model Interaction Learning with Learning Motivation Against Learning Outcomes Human Skeletal System*

Periódico Tchê Química. ISSN 2179-0302. (2020); vol.17 (n°36)
Downloaded from www.periodico.tchequimica.com

411

LEARNING MOTIVATION TO LEARN

Instructions for Questionnaire Filling

Select the assessment score using the checklist ($\sqrt{}$) on a Likert scale (Strongly Agree (SS) = 5, Agree (S) = 4, Less Agree (KS), Disagree (KS) TS) = 2 and Strongly Disagree (STS) = 1).

No.	Statement of	Alternative Answers				
		SS	S	KS	TS	STS
1	You pay attention to the material delivered by the lecturer from beginning to end.					
2	You always delay doing the assignment given by the lecturer					
3	You are eager to take part in the learning activities.					
4	You always want the learning to be completed quickly by the lecturer					
5	You are serious about participating in the learning activities					
6	You know the rules explained by the lecturer regarding the rules and regulations during the learning activities					
7	You try to understand the material delivered by the lecturer					
8	You don't understand the material delivered by the lecturer					
9	The material delivered by the lecturer, with you understand					
10	You need repetition of the material from the lecturer so you can understand the material					
11	You get the benefits of participating in learning the subject of natural science concepts					
12	You feel that you don't understand the benefits of participating in the learning activities of the basic science course subjects					
13	You can concentrate during the learning activities of the course basic concepts of science					
14	when exam, you attempt to answer with your abilities					
15	you need to open the notebook when the task					
16	civil bold expression class in front of					
17	you feel embarrassed when I express an opinion in front of the class					
18	I feel discussing with friends exciting					
19	You feel less confident to discuss with friends					
20	In doing competitive tasks, you try to be superior to friends					
21	Feel learning activities of basic science concepts are useful later on					
22	Feel the learning activities of basic science concepts courses can answer my curiosity					
23	Participate in learning activities from beginning to end					
24	You do not like it if there are friends who help with your assignments					
25	lecture weight encourages to get the best value					
26	I feel equipment during the activity learning of basic science concepts courses are met					

EXAMPLE OF PRE-TEST FORMATIVE TEST
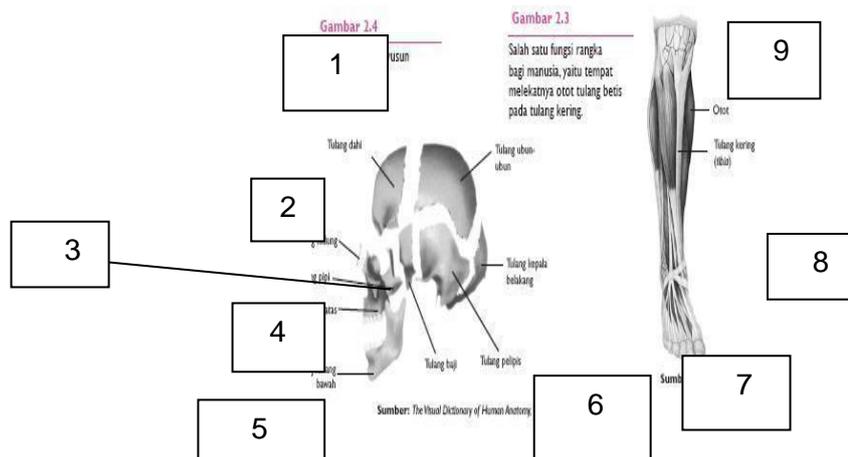
Formative Tests Pre Test

Put a Cross (X) on the Answer That You Think Is Right!

1. Among the bones with each other bones connected by...
    a. Muscle
    b. Framework of
    c. collagen
    d. joints

2. Function bone to our bodies, among others ...
    a. Giving shape
    b. circulatory Points
    c. muscles forming
    d. Points attach organs in

3. For example, organs are composed of cartilage is .. .
    a. The nose and earlobe
    b. mouth and nose
    c. cheeks and mouth
    d. and cheekauricle

4. boneloud composed of ...
    a. calcium and ligaments
    b. calcium and joints
    c. ligaments and collagen
    d. collagen and calcium

5. Here are forms of bone are:

1) The thigh bone	4) bone shank
2) bone soles of the feet	5) Arm
3) bones Chest bones	6) Palm bones

    Which are included in the pipe bones are indicated by numbers ....
    a. 1, 4, and 5
    b. 1, 2, and 3
    c. 4, 5, and 6
    d. 1, 5, and 2

Periódico Tchê Química. ISSN 2179-0302. (2020); vol.17 (n°36)
Downloaded from www.periodico.tchequimica.com

413

6. Pay attention to the draw a skull bone below.

Cheekbones, temples, and wedge bones are shown by numbers ...

a. 3, 9, and 1

b. 6, 7, and 3

c. 3, 6, and 7

d. 3, 7, and 6

Periódico Tchê Química. ISSN 2179-0302. (2020); vol.17 (n°36)
Downloaded from www.periodico.tchequimica.com

414