



Evaluation of Animated Videos in Biostatistics Course for Students of the Faculty of Dentistry, Universitas Yarsi

Lisa Prihastari^{1✉}, Zwasta Pribadi Mahardika²

Dental Public Health and Prevention Department, Faculty of Dentistry, Universitas Yarsi, Indonesia¹

Medical education Department, Faculty of Dentistry, Universitas Yarsi, Indonesia²

e-mail : lisa.prihastari@yarsi.ac.id¹ , zwasta.mahardika@yarsi.ac.id²

Abstrak

Dalam proses pembelajaran di perguruan tinggi, agar mahasiswa dapat mencapai tujuan belajar yang diharapkan maka dosen harus memiliki strategi-strategi yang efektif dan efisien salah satu contohnya dengan penggunaan media video animasi. Pemanfaatan animasi dalam proses pembelajaran biostatistik di Fakultas Kedokteran Gigi masih jarang dilakukan. Tujuan penelitian ini adalah untuk mengetahui pengaruh penggunaan media pembelajaran Animasi dan gaya belajar mahasiswa terhadap prestasi belajar yang diukur dengan tingkat pengetahuan pada mata kuliah Biostatistik di Fakultas Kedokteran Gigi Universitas Yarsi. Metode yang digunakan penelitian adalah jenis analitik quasi experimental yaitu menguji pengaruh media pembelajaran terhadap hasil belajar dengan membandingkan kelompok perlakuan dengan animasi dengan kelompok kontrol yang hanya menggunakan media berupa visual (kuliah power point) pada sejumlah 45 mahasiswa. Hasil penelitian ini menunjukkan bahwa setelah diberikan animasi biostatistik ada kenaikan nilai rata-rata ujian yaitu dari 39,78 menjadi 66,22. Hasil uji *Wilcoxon test* menunjukkan terdapat perbedaan yang signifikan antara nilai pretest dan posttest mahasiswa setelah mendapatkan intervensi video animasi biostatistik yaitu $p = 0,0001$ ($p < 0,05$). Variabel jenis kelamin, asal sekolah, dan gaya belajar tidak mempengaruhi rata-rata nilai ujian mahasiswa. Kesimpulan penelitian ini adalah pembelajaran biostatistik dengan video animasi memberikan hasil yang signifikan terhadap pengetahuan mahasiswa.

Kata Kunci: biostatistik, animasi, kedokteran gigi, mahasiswa

Abstract

The learning process in higher education requires students to achieve the expected learning goals. Therefore, lecturers are obliged to possess effective and efficient strategies, one of which is the use of animated video media. The use of animation in the biostatistics learning process at the Faculty of Dentistry is still rarely done. Objective: The aim of this research is to determine the influence of using animated learning media and students' learning styles on academic achievement, measured by the level of knowledge in the Biostatistics course at the Faculty of Dentistry, Yarsi University. The research method used is a type of quasi-experimental analytic, which tests the effect of learning media on learning outcomes by comparing the treatment group with animation to the control group that only uses visual media (PowerPoint lectures) involving 45 students. The results of this study indicate that after receiving biostatistics animation, there is an increase in the average test score from 39.78 to 66.22. The Wilcoxon test results show a significant difference between the pretest and posttest scores of students after receiving the biostatistics animated video intervention, with $p = 0.0001$ ($p < 0.05$). Variables such as gender, school of origin, and learning style do not affect the average test scores of students. Conclusion: Learning biostatistics using animated video provide a significant difference to the knowledge of students

Keywords: biostatistics, animation, dentistry, students

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✉Corresponding author :

Email : lisa.prihastari@yarsi.ac.id

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INTRODUCTION

The role of media in learning is very important because it can clarify the presentation of information messages from lecturers, facilitate the learning process and improve student learning outcomes. Learning media can also direct students' attention, leading to learning .motivation, and help them to study independently and achieve learning targets (Kustyarini, Utami and Koesmijati, 2020). The learning process in higher education requires students to achieve the expected learning objectives, demanding the lecturers to possess effective and efficient strategies. One of the supporting factors in achieving learning goals is the use of appropriate media as a variety of teaching that can eliminate student boredom in processing the material provided, apart from the fact that lecturers are required to keep up with the times moving from the conventional learning process to the technological era of the industrial revolution 4.0. Learning materials delivered visually are the most common media used by educators in Indonesia such as books, PowerPoint materials, and modules. However, their drawbacks are that they do not display sound, animation, and video, as well as are not interactive (Prabowo, A., et al., 2018).

The use of animation in the learning process can improve the quality of the process and learning outcomes because animated films are interesting. Several studies prove that animated film media had a positive attitude from the students. They became better at explaining the content of the material because it was explained in the form of images. This happened because audiovisual media used more of the sense involved, especially the ears and eyes to process the information (Diah *et al.*, 2020). Learning with animation methods has also proven to be effective and can be applied to mathematical materials, which are generally difficult to convey through visuals (Antaka Adi, Relmasira and Tyas Asri Hardini, 2019); (Widjayanti, Masfingatin and Setyansah, 2018). Learning materials are considered difficult because they are too verbal and require visualization can be taught using animated media, such as biostatistics lecture materials. Some materials in biostatistics lectures require visualization to be easily understood by the students. Learning style is also an important variable to be investigated as it can influence the academic performance of students in the Faculty of Medicine (Cintiya and Yulfi, 2023). Learning styles can include visual, auditory, and kinesthetic styles, which in some individuals may encompass all three styles, but generally tend to lean towards one predominant learning style (Shah, Yadav and Sharma, 2016).

Therefore, researchers conducted a study on the use of animated video media to improve student knowledge. The novelty of this research lies in the absence of prior studies on biostatistics animation among dental students, particularly in relation to other learning styles and sociodemographic factors. Researchers examined the correlation between student learning styles and learning achievement in the Biostatistics course. This research can contribute to educators by providing insights into innovative teaching methods.

METHOD

This study employed a comparative analytic quasi-experimental design with pre and post-test techniques in the treatment group. This study involved third-semester students of the Faculty of Dentistry of Universitas Yarsi, selected using a total sampling method, 45 students who were taking the community dentistry block. The study was conducted in September 2020 at of the Faculty of Dentistry of Universitas Yarsi . The ethical protocol of this study was reviewed and approved by the Universitas Yarsi ethics committee. Research subjects signed the informed consent as a sign of willingness to participate after getting an explanation from the researchers.

The study commenced with the development of an animated video on biostatistics, designed to fulfill the anticipated learning objectives related to statistical types, research sampling methods, and various statistical tests. The data were collected by measuring the pre and post-test scores of students after being given

intervention in the form of animated biostatistics videos with lecture topics on types of sampling methods and various research measurement scales. Students were also asked through an online questionnaire about their learning styles and opinions about the level of difficulty in biostatistics. The researcher utilized calibrated enumerators to collect and analyze the data. The results of the questionnaire were then related to their biostatistical test scores.

RESULTS AND DISCUSSION

Results

The frequency distribution of research respondents based on sociodemographic status are the largest gender proportion was female students of 36 respondents (65.5%) while only 9 male respondents of the study (16.4%). Sociodemographic data showed that most students graduated from public senior high school of 29 respondents (52.7%) while the most used learning style by students was the visual learning style of 20 respondents (36.4%). The results of the questionnaire indicate that most of the students in the biostatistics course found biostatistics to be quite difficult of 32 respondents (58.2%).

Table 1. Frequency distribution of respondents' biostatistics scores

Variable	Mean	SD	Min	Max
Pretest Score	39.78	21.16	0	90
Posttest Score	66.22	22.39	20	100
Summative Score	51.41	14.49	13	87
Final Exam Score	46.98	9.36	25	74

Table 1 presents the results of the pre and post-test scores of students with the animated video intervention. Before the treatment, being given the video, the average knowledge score of the respondents was 39,78%, while after being given the intervention, it increased to 66,22. The results of the overall evaluation of the biostatistics course with an average summative score of 51.41 and the final exam score decreased to 46,98.

Table 2. Wilcoxon test results on the pre and post-test scores

Variable	Total (N)	p-value	95% CI
Pretest Score <i>Negative Ranks</i>	0 ^a		33.42-46.13
Posttest Score <i>Positive Ranks</i>	38 ^b	0.0001	59.50-72.95
<i>Ties</i>	7 ^c		
Total			

a. Posttest Score < Pretest Score

b. Posttest Score > Pretest Score

c. Posttest Score = Pretest Score

Table 3. Test results of parametric and non-parametric differences in respondent scores

VARIABLE	Δ pre-post test (Min-max)	P-Value	Summative Score (SD)	P-Value	Final Exam Score (SD)	P-Value
Gender						
Male	20(0-70)	P=	47.04(10.6)	P=	43.56(9.06)	P=
Female	20(0-70)	0.686	52.50(15.23)	0.317	47.83(9.36)	0.317
High school origin						
Public	20(0-70)	P=	50.80(15.05)	P=	47.41(9.27)	P=

Private	30(0-70)	0.810	52.50(19.90)	0.712	46.19(9.81)	0.712
Learning Style						
Visual	20(0-70)	P=	54(17.12)	P=	49.30(10.1)	P=
Auditory	20(10-60)	0.619	51.67(15.14)	0.426	47.08(9.08)	0.426
Kinesthetic	30(0-70)		47.18(8.03)		47.18(8.03)	
Biostatistics						
difficulty	20(0-50)	P=	50.56(15.4)	P=	50.56(15.4)	P=
Not Hard	20(0-70)	0.984	52.19(15.60)	0.833	52.19(15.60)	0.833
Quite Difficult	20(0-70)		48.57(8.36)		48.57(8.36)	
Very Difficult						

Discussion

The results presented in Table 3 indicate that the intervention by giving biostatistical animation videos can increase the posttest scores of students. This supports several studies that the use of video animation as a learning method showed a significant difference in the before and after scores (Desy *et al.*, 2021). This increase occurs because the animated video creates a pleasant atmosphere and attracts attention for students making it easier for them to understand the knowledge transferred, especially for students who have a visual learning style (Akla, 2021). In this study, most of the students had a visual learning style. Thus, they like the depiction and display that makes it easier for them to imagine and absorb information (Ismail, A, 2017). The results in Table 3 indicate that there is no significant difference between male and female scores, both in terms of summative scores and final exam scores of the biostatistics course. Many studies prove that gender is included in the factors that influence success in learning, but this is also influenced by many factors, one of which is psychological, family support, economics, and others. In general, female students have a better level of persistence and motivation than males, but male students have advantages in matters related to logic, such as mathematics and science. This study did not show significant results perhaps due to the lacking number of respondents and there was no balance in comparison between male and female respondents (Akabayashi *et al.*, 2020).

The learning styles in this study also did not show a significant difference for students with visual, auditory, and kinesthetic learning styles had the same value abilities as also the results of other studies (Masela and Subekti, 2021) ; (Barokah *et al.*, 2021). A good learning process should be able to facilitate all the senses, both visual, auditory, and kinesthetic because by optimizing all three, the results obtained will be maximized. Another study supports the finding of this study that most medical students use visual and auditory learning styles rather than kinesthetic (Buşan, 2014). Differences in learning styles do not prevent students from getting good results or grades in exams. All learning styles mean that they have their advantages and disadvantages, back to the individual who applies them (Albeta *et al.*, 2021). The results of this study provide benefits for educators, indicating that animation can enhance understanding for students in the health field, making biostatistics no longer perceived as a challenging subject for them. Further research is needed, especially studies that explore the relationship between learning styles and biostatistics grades with a larger sample size that represents the population more comprehensively.

CONCLUSION

Biostatistical animation videos provide a significant difference to the knowledge of students. This is crucial as it can contribute to improving the average test scores of students. Thus, learning media with animated videos can be applied in the biostatistics course. Gender and the learning styles used by students in this study do not show a significant difference on test scores. It means that each learning style has its own strengths and can yield optimal results, no learning style was better than the others. Further research is

needed to explore other variables that can influence students' grades, such as learning facilities, parental support, and others, using a larger sample size.

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