

## The Use of Digital Illustrators in Histology Practicum Learning of Medical Students In Gorontalo: Perception Study

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### ABSTRACT

**Introduction:** Medical students need to learn histology to understand the relation between microscopic structure and function of cells and tissues. Pictures of manual preparation made by students can be used as notes and can describe students' understanding of the observed structures. Producing good pictures in a short time is a challenge for medical students. The use of digital illustrator technology is expected to be a solution to overcoming these problems. This study aims to measure the perception of acceptance and satisfaction rate of medical students in Gorontalo towards digital illustrators in apprehend histology practicum.

**Method:** Cross-sectional descriptive survey with modified questionnaires from previous studies. The sampling technique used purposive sampling and involved 54 first-year students. The raw data were analyzed using Microsoft Excel. The mean value calculated for each item was compared with the theoretical mean value of 2.50 to determine whether the respondents agreed with the statement.

**Results:** All items have an average rating exceeding the theoretical mean of 2.50. Also, the mean of 3.91 (SD = 0.58) for all items substantially exceeds the theoretical mean. Items with the highest perceived rate of perceived utility, ease of use, intention to use, and actual use of digital illustrator teaching materials in learning practical skills will significantly increase students' motivation, interest, and acquisition of practical skills.

**Conclusion:** the use of digital illustrators is perceived positively by medical students in helping histology practicum learning, which is indicated by the high rate of acceptance and rate of satisfaction with its use.

**Key words:** Digital illustrator, histology practicum, medical student



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## **Introduction**

Histology studies the microscopic structure of normal cells and body tissues. This science is the basis for understanding disease pathology, diagnosis, and practice of medicine, as well as research in medicine and health.<sup>1</sup> Medical students need to study histology to understand the relationship between microscopic structure and function of cells and tissues. Studying histology requires observing two-dimensional images of tissues and organs, which are three-dimensional structures. The structure of the function of human tissue is a complex material because it is divided into sub-materials with a broad scope.

Drawings of manual preparation made by students can be used as notes and describe students' understanding of the observed structure. However, producing good pictures takes quite a long time, while in the medical curriculum, there is not much time allocation for practicum, so students tend to finish drawings without having time to observe the preparations seriously.<sup>1</sup> According to the Law of the Republic of Indonesia, number 20 of 2003, education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop potential, personality, intelligence, noble character, and skills needed by themselves, in society, nation and state.<sup>2</sup> In education, the role of technology is an absolute value that must be mastered to meet the era of globalization with the competition of rapid technological advances. Online media, as a form of technological sophistication, plays a significant role in human life, improving health and education services for the world's citizens. In the digital era of benefits in the context of education, based on a study of the purpose of using technology in leading education in America, Alavi and Gallupe found several purposes of using technology, namely increasing competitive positioning, improving brand image, improving the quality of learning and teaching, increasing students' satisfaction, improve service quality, reduce operating costs, and develop new products and services.<sup>3</sup>

Digital illustrator aims to make it easier for medical students to understand the material and increase their understanding of medical histology. Therefore, this study aims to raise the acceptance and satisfaction rates of medical students in Gorontalo toward digital illustrators understanding histology practicum.

## **Methods**

The study performed a cross-sectional descriptive survey with a modified questionnaire from a previous study.<sup>4</sup> Rate of satisfaction and acceptance of digital illustrators (Biorender, Canada) were measured as the primary variable in this study. This

study was conducted at the Faculty of Medicine Universitas Negeri Gorontalo, Gorontalo, on March 2022. This study has complied with ethical clearance, and all participants gave their consent to participate in the study. Participation was based on their will, as presented in the first section of the questionnaire.

### ***Population and Sample***

The population was all 150 students studying at the Faculty of Medicine in the academic year 2021/2022. A first-year student who followed the biomedical subjects was included in this study. The student who had quit were excluded from this study. The study used purposive sampling and involved 54 first-year students, 11 men, and 43 women.

### ***Data Collection Procedures***

The data were collected in March 2022, in a single day. A google form was used for the study and distributed through social media groups. Therefore, it takes relatively little time for the respondents and researchers to complete and score the google form.

### ***Method of Data Analysis***

The raw data were analyzed using the Microsoft Excel 2010 version (Microsoft inc, USA). Initially, descriptive statistics such as percentages, means, and standard deviations were used to analyze the data collected. The computed mean rating for each item was compared with the theoretical mean rating (assuming a normal distribution of responses) of 2.50 to determine whether respondents agreed with the statements. Any computed mean of an item over 2.50 showed agreement with the statement, whereas item means less than 2.50 indicated disagreement.

### **Results**

This study was conducted on 54 medical students with the frequency of gender, consisting of 11 men and 43 women. The level of acceptance and satisfaction of digital illustrators among students is shown in Table 1 and Table 2.

The computed mean rating for each item was compared with the theoretical mean rating (assuming a normal distribution of responses) of 2.50 to determine whether respondents agreed with the statements. Any computed mean of an item over 2.50 showed agreement with the statement, whereas item means less than 2.50 indicated disagreement with the statement. The results indicate that all the items had mean ratings far exceeding the theoretical mean of 2.50. All the items substantially exceeded the theoretical mean, they expressed high levels of perceived usefulness, ease of use, intention to use, and actual usage of the digital illustrator instructional materials in learning practical skills will significantly enhance learners' motivation, interest, and practical skills acquisition.

**Table 1.** Level of Acceptance of Digital Illustrator Among Medical Student

Element of acceptance of the digital illustrator	Mean Rating	Standard Deviation
<b>Perceived Usefulness</b>		
1. Digital illustrator improve my performance in doing practical work in histology practice	4.06	0.76
2. Digital illustrator improve my acquisition of practical skills in histology practice prepare	4.13	0.82
3. Digital illustator enhance my effectiveness in performing practical work in	3.93	0.79
4. I find the Digital illustrator useful in acquiring practical skills in histology practice prepare	4.04	0.82
<b>Perceived Ease of Use</b>		
5. Operating the Digital illustrator is easy for me	3.85	0.80
6. I find it easy to get the Digital illustrator to learn practical lessons in histology practice prepare	3.89	0.83
7. It was easy for me to become skillful in learning practical lessons in histology practice prepare with the use of the Digital illustrator.	4.00	0.69
8. I find the Digital illustrator easy to use	3.81	0.86
<b>Behavioural Intention to Use</b>		
9. I intend to use the Digital illustrator regularly in learning practical lessons in histology practice prepare	3,70	0,96
<b>Actual Usage</b>		
10. I use the digital illustrator regularly to learn practical lessons in histology practice prepare	3,76	0,86

**Table 2.** Level of Satisfaction of Digital Illustrator Among Medical Student

Element of satisfaction with the digital illustrator	Mean Rating	Standard Deviation
1. I find the Digital illustrator lessons enjoyable.	3,81	0,86
2. The Digital illustrator have contributed greatly to my acquisition of relevant skills in histology practice prepare	3,94	0,78
3. I find the Digital illustrator lessons to be effective in meeting the learning objectives.	3,94	0,76

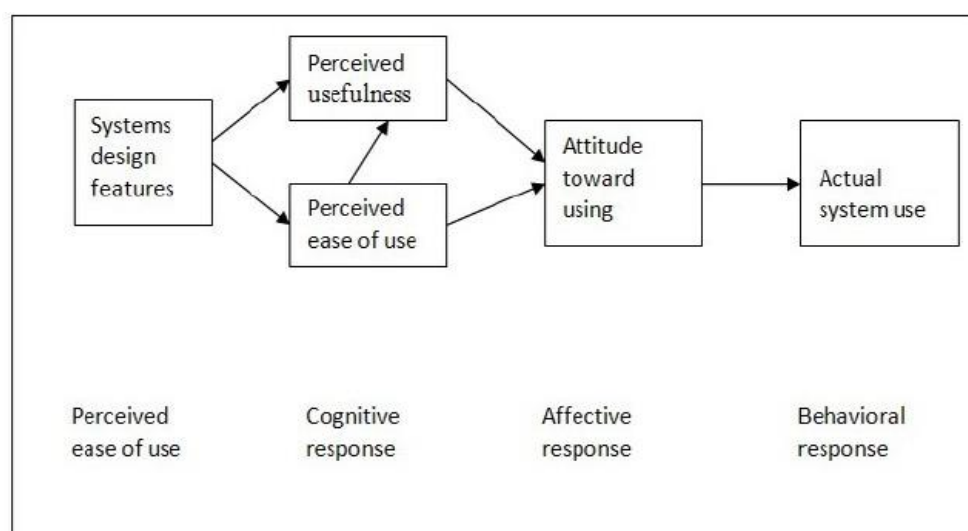
4. I would describe the Digital illustrator lessons as being highly interesting.	3,83	0,88
5. I would recommend use of the Digital illustrator lessons to my colleagues.	3,74	0,89
6. The Digital illustrator lessons make me spend more time studying to acquire practical skills.	3,80	0,89
7. I am satisfied with my learning from the Digital illustrator	3,93	0,84

## Discussion

The acceptance level of students about the digital illustrator in their responses varies from "strongly agree" to "strongly disagree." Students' standard terms and phrases to express their satisfaction with the digital illustrator include strongly disagree, disagree, neutral, agree, and strongly agree. The mean rating for each of the ten learner acceptance items as rated by the respondents and the resultant mean rating for all the items were computed and compared with the theoretical mean rating (assuming a normal distribution of responses) of 2.50. This reference was to determine whether students responded positively to the digital illustrator. The computed means and the corresponding standard deviations appear in Table 1. Table 1 indicates that all the items had mean ratings far exceeding the theoretical mean of 2.50. Also, the mean of 3,91 ( $SD = 0.58$ ) for all the items substantially exceeded the theoretical mean. As indicated in Table 1, the item "I intend to use the Digital illustrator regularly in learning practical lessons in histology practice prepare" (Item #9) had the least mean rating of 3.70 ( $SD = 0.96$ ). Though it had the least mean rating, the value of 3.310 substantially exceeded the theoretical mean of 2.50. The highest mean rating of 4.13 ( $SD = 0.82$ ) related to the item "Digital illustrator improve my acquisition of practical skills in histology practice prepare" (Item #2). The reported high ease of use could be due to the quality of the materials regarding content, text, images, and sound. Indeed, when viewed, the images appear suitable and visible; the texts are visible and easy to read, as the fonts are bold and precise; there is a good contrast with the background, and the screens appear clean and uncluttered. Thus, the study's results showed that distant learners responded positively to the digital illustrator and that the materials were well received. It is hoped that the expressed high levels of perceived usefulness, ease of use, intention to use, and actual usage of the digital illustrator instructional materials in learning practical skills will significantly enhance learners' motivation, interest, and practical skills acquisition.

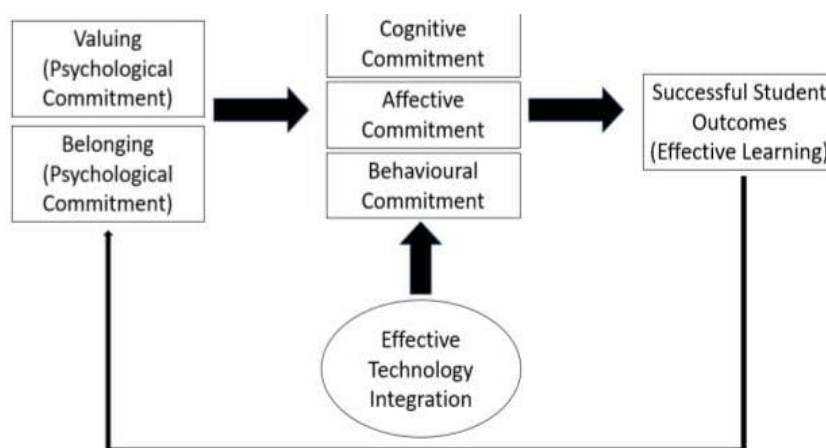
The satisfaction level of students about the digital illustrator in their responses varies from "strongly agree" to "strongly disagree." Students' common terms and phrases to express their satisfaction with the digital illustrator include strongly disagree, disagree, neutral, agree, and strongly agree. Most of the respondents indicated that they were satisfied with the digital illustrator. "The digital illustrator has contributed greatly to my acquisition of relevant skills in histology practice prepare" and "I find the Digital illustrator lessons to be effective in meeting the learning objectives." The mean rating for each of the ten learner acceptance items as rated by the respondents was computed for each of the three study centres that participated in the study (Table 2). The mean ratings for the three sub-groups are high and appear quite close for many items. The result notwithstanding, it was deemed appropriate to determine whether the observed differences were statistically significant, using a digital illustrator at the 0.05 level of significance.

Attitudes Towards Using (ATU), Behavioural Intention (BI), and Actual Usage (AU) are defined as follows: Perceived Usefulness (PU) is defined as the degree to which a person believes that using an IT system would improve his/her job performance.<sup>5</sup> Perceived Ease of Use (PEOU) is the degree to which a person believes using an information technology would be free of effort. Attitudes Towards Using (ATU) is a function of beliefs, positively or unfavorably, towards the behavior. Behavioral Intention (BI) is our goals, aspirations, and expected responses to the attitude object. Actual Usage (AU) is defined as the frequency of using a new technology system, such as mobile voting, and the approximate number of times the user uses it in a given period.



**Figure 1.** Original Technology Acceptance Model (TAM).<sup>5</sup>

"Engagement and Technology Integration Theory" developed by Gunuc was used within the scope of the research. In this theory, technology integration is discussed at the micro level. In-class and out-of-class teaching and learning activities have been designed. The basis of this theory is not only the teacher. Both the teacher and the student are at the center. The basic idea of the theory is to explain that student engagement and technology integration are related to student success and practical learning. Gunuc expresses student engagement as follows: "Student engagement is the quality and quantity of the student's psychological, cognitive, affective, behavioral responses and energies to participate in the learning process, academic and social activities inside/outside the classroom to achieve successful learning outcomes."



**Figure 2.** The Engagement and Technology Integration Theory.<sup>6</sup>

When the previous theory is examined, first of all, it is necessary to emphasize students' feelings of value and belonging. After these steps are fulfilled, activities should be done to create cognitive, affective, and behavioral commitment. These should be accomplished by providing practical technology integration. As a result, feelings of commitment will be combined with technology integration, and effective learning outcomes will be created.

## Conclusion

Based on the research results that have been done, it is concluded that there showed high acceptance and satisfaction of the digital illustrator in practical skills. The learners expressed high perceived usefulness, ease of use, and intention to use the digital illustrator in learning practical histology skills. The learners also found the materials relevant, effective, enjoyable, and exciting and would recommend them to their fellow students for use. The

expressed high acceptance of and satisfaction with the video-based instructional materials was, to a large extent, also uniform among the respondents of the three study centers. Thus, irrespective of location, the learners generally appeared optimistic about their experiences using the digital illustrator to learn histology practicals in medical faculty.

### **Conflicts of Interest**

Nothing to declare

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Nothing to declare

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Nothing to declare

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