

**Animation-Based Learning Motivation Analysis  
on Human Digestive System Material to Evaluate Students' Motivation**

**Jaharuddin Tanjung**

Universitas Labuhanbatu

E-mail: jaharuddintanjung1@gmail.com

**Hasmi Syahputra Harahap**

Universitas Labuhanbatu

E-mail: hasmi.putraharahap@gmail.com

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**Abstract**

This study aims to evaluate students' indication-based learning motivation as well as the level of animation-based learning motivation in the class XI *Ilmu Pengetahuan Alam (IPA)* at *Sekolah Menengah Atas (SMA) Negeri 2 Rantau Utara* on human digestive system material. Descriptive statistical analysis is used in the research method's quantitative component. Out of the 141 students in the XI Science class, 105 participants were randomly chosen from three classrooms using a purposive sampling technique. Instrument testing was done to ascertain the reliability and accuracy of the angles, questioner. The study's methodology used the Student Learning Motivation Questionnaire. Data analysis techniques using quantitative descriptive analysis assisted by SPSS for Windows program. The findings revealed that students in class XI IPA 1 had extremely high levels of learning motivation (82.09), class XI IPA 2 had good levels 72.31, and XI IPA 3 had low levels 64.77 (good). Student motivation is measured by indicators such as persistence in learning, which has an average value of 77.65(good), tenacity in overcoming challenges, which has a value of 72.51(good), interest in learning, which has a value of 82.57(very good), achievement in learning, which has a value of 81.10(very good), and independent indicator in learning, which has a value of 74.21(good). Teachers should be able to use learning innovations like animated media or other interactive media to continue motivating students to learn as a result of this study's follow-up findings. This will ensure that students are always interested in what they are learning.

**Keywords:** learning motivation, animation, human digestive system

## **INTRODUCTION**

The world of education is entering a new era thanks to technological developments that make education more complex and advanced. Education is the most important thing that humans do to develop intelligence and good character. Education is the interaction between teachers and students that helps students develop their potential. The world of education is moving into a new era where education is increasingly complex and advanced thanks to technological developments. Education is the most important thing that humans do to develop intelligence and good character. Education is the interaction between teachers and students that helps students develop their potential (Rahmi, 2020) . In learning biology at school, students' memorization is emphasized, while aspects related to students' understanding of the material are ignored. A student can learn a subject simply by memorizing the contents of the textbook without understanding the material. With the influence of optimal media can generate a desire to learn fun so that students can capture or absorb learning material quickly and precisely. In this way the curriculum objectives are achieved.

The special curriculum for learning applied sciences in 2013 includes several materials, one of which is the human digestive system. The material for the digestive system includes energy requirements, types of nutrients and their functions, digestive organs and their functions, digestive enzymes and digestive processes in the human body (Arimadona et al., 2022) . In particular, because the characteristics of the material are versatile and generally abstract, it makes it difficult for students to understand the material. Research Yurtseven (2022) it can be concluded that students generally have difficulty understanding body processes because they are abstract in nature and require scientific explanation and evidence.

The digital age evolves with time, so people have many different creative ideas in life. Technological developments that are increasingly rapid and developing have a positive effect on educational progress (Wang, 2022) . As a teacher in managing learning to use media as a teaching and learning tool (PBM). Learning media cannot be separated from learning. According to Shihusa (2009), educational media are intermediaries or instruments to convey learning messages and ideas. So that it can lead to students' thoughts, feelings, interests, actions and attention, which leads to teaching and learning with students. Because with the help of study materials, students can understand the study material better. In the learning process, not only lecture and discussion methods are used, but media is also needed as a learning tool (Bulic, 2020; Corkin, 2017; Prawita, 2019) . The learning environment has various forms, for example tangible objects, audio-visual aids, while learning biology in school institutions emphasizes students' memorization abilities, but aspects related to students' understanding of the material are neglected. A student can learn a subject simply by memorizing the contents of the textbook without understanding the material. With the optimal use of media, of course learning will be absorbed perfectly by students, besides that teachers become accustomed to being creative and innovating so that students who have high creativity and high other thinking are born.

In 2003, applied science learning curriculum includes several materials, one of which is the human digestive system. The material of the food digestive system includes energy requirements, types of nutrients and their functions, digestive organs and their functions, digestive enzymes and digestive processes in the human body (Egorov, 2002). In particular, because the characteristics of the material are versatile and generally abstract, it makes it difficult for students to understand the material. Like research

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As a teacher in managing learning to use media as a teaching and learning tool (PBM). Because with the help of learning materials, students can understand the discipline material better. In the learning process, not only lecture and discussion methods are used, but media is also needed as a learning tool. The learning environment takes various forms, such as tangible objects, audio-visual learning aids. Learning media are carriers or channels of information that can evoke thoughts, feelings and wills so that a teaching and learning process occurs between teachers and students (Rahmi, 2020) .

The media is expected to be a stimulant and increase students' enthusiasm for learning. Gagne explained that "the media is a different part of the student environment that can stimulate them to learn" (Syavira, 2021) . Media in the learning process is very important because it can facilitate the delivery and distribution of messages intended by the teacher to create a learning environment that supports efficient and effective learning. There are many tasks involved in learning through media. Some of the functions of the media in learning are : (1) the clarity of oral information; (2) increase the stimulant and effectiveness of communication; (3) improve the efficiency and effectiveness of data transmission; (4) Enriching the uniqueness in the presentation of teaching materials; (5) Material is easy to absorb and more memorable, learning will be stored in students' long term memory instead of short term memory so that the material obtained can be remembered for a long time; (6) students see concretely or concretely, rather than just narratives that make students think abstractly; (7) Increase curiosity; and (8) provide incentives and encourage students to respond well.

The use of visual aids is very appropriate in the teaching and learning process. However, the teacher does not have much time to prepare the media used in teaching every day. That the teacher prefers to carry out standard learning assignments or lecture methods with students. Utilization of the learning environment is very important to increase student learning stimulants , so that the grades obtained meet the KKM requirements (Minimum Completeness Criteria). The selection of the learning environment must also be in accordance with the characteristics of the students. Adjustment of the learning environment with the character of each student and purposeful work. Learning media can be taken directly from the surrounding environment. However, not all materials depend on the surrounding environment. As well as gastrointestinal and respiratory materials. Most students enjoy learning science because they are interested in the media they use for learning. One environment that fits the characteristics of students is an animated environment, which helps stimulate students in the spirit of learning.

Animation Media To make it easier to study the human digestive system, a source has been developed that can combine animation , text, images, and video into one source that is connected to a navigation system, namely. macro flash environment. Macromedia Flash is an application for displaying images or visuals, text, animation and audio together , so that the use of Macromedia Flash to develop educational resources is very possible. (Werimon et al., 2017). Macromedia Flash also has advantages such as high-quality display, supports various animation combinations, can integrate all the tools needed to create educational media, and can be stored on a CD for easy use and distribution. (Yuliono et al., 2018).

Interviews when meeting with biology teachers obtained information on class XI students of SMA Negeri 2 Rantau Utara in the subject of the human digestive system that had not reached the minimum criterion , namely an average of 76. However, the minimum

criterion for perfection was 80. In the subject matter of the human digestive system, animation never used as a teaching tool, but only theoretical excerpts listed in the textbook studied. Interviews were also conducted with students, students said they were bored in learning because there was too much material about the human digestive system, it was difficult to understand, because the process was not visible directly to the eye, and there was a lot of memorization. It can be concluded that there is a need for a medium to present material about the human digestive system. One easy way for students to learn about the human digestive system is through the use of animation media.

Animation media is a learning environment in the form of a physical and technical learning process that can facilitate teachers in delivering subjects to students, as well as practically achieving predetermined learning plans. In addition, (Alfiyana et al., 2018) the puppeteer media in the academic scope holds good effectiveness in supporting the implementation of the teaching and learning process. Media activities for educational purposes require a lot of information contained in the media. Information must involve students both spiritually and mentally and in the form of real activities so that learning takes place. Regarding learning principles, materials should be designed more systematically and psychologically to prepare for effective teaching. Apart from being fun, learning media must provide a pleasant experience and meet the individual needs of students. In research (Arimadona et al., 2022), Macromedia Flash can be used as a digital learning tool that supports interest in teaching, educational goals and student learning to become independent.

Macromedia flash can be used as an answer in carrying out biology education by optimizing learning media in schools to support the use of macromedia flash, such as LCD screens, projectors, speakers, etc. Macromedia Flash can offer advantages when used positively as a digital tool. Macromedia flash affects the interaction and learning outcomes between the learning environment and critical thinking compared to other learning environments.

Learning media is a channel for evoking feelings, thoughts and wills so that between educators and students there is a process of transferring knowledge. The use of instructional media should be able to generate motivation and increase student enthusiasm for learning. This is in accordance with Gagne's explanation that "the media is a different part of the student environment that can motivate them to learn" (Mutmainnah et al., 2021). Learning media is important because it can facilitate the delivery and distribution of messages intended by the teacher to create a learning environment that supports effective and efficient learning.

Visual aids are especially suitable for use in teaching and learning. However, the teacher does not have much time to prepare the media used in teaching every day. That the teacher prefers to carry out standard learning assignments or lecture methods with students. Utilization of the learning environment is very important to increase the fighting power of students, so that the results obtained meet the KKM requirements (Minimum Completeness Criteria). The selection of the learning environment must also be in accordance with the characteristics of the students. Adjustment of the learning environment with the character of each student and purposeful work. The learning environment can be taken directly from the surrounding environment. However, not all materials depend on the surrounding environment. As well as gastrointestinal and respiratory materials. Most students enjoy learning science because they are interested in the media they use for learning. One environment that fits the characteristics of students is environmental animation, which helps students' fighting spirit in the spirit of learning.

Based on observations made at SMA Negeri 2 Rantau Utara, information was obtained that teachers used lecture methods and group discussions in the biology learning process. Teachers also use media in the form of textbooks and PowerPoint slides to motivate students. While studying, many students play games, chat with their friends to concentrate. Therefore students no longer pay attention to the disciplines given by the teacher, and students are not motivated to follow the disciplines given.

## METHOD

The research method used is a quantitative approach with descriptive analysis. The expected results in this study are a description of the level of student motivation in the human digestive tract material in class XI SMA Negeri 2 Rantau Utara. The research was conducted at SMA Negeri 2 Rantau Utara Jalan Siringgo-ringgo, North Rantau District, Labuhan Batu Regency, North Sumatra Province, Postal Code 21411. In addition, the results of field observations also assumed that the distribution of the population studied was homogeneous. This is because student placement is not based on academic merit.

The sample used in probability is class XI. 1, class XI.2 and class XI.3 are shown in the following table:

Table 1. Research Sample

No	Class	The number of students
1	XI. 1	35
2	XI. 2	35
3	XI. 3	35
Total		105

The sample was taken by *purposive sampling* or sampling with the aim that classes XI.1 , XI.2, and XI.3 were used as research samples while XI-4 was used as a research instrument trial class. It is also taken into consideration that the ability of researchers is seen from the funds, manpower and time as well as the narrow range of observations of each subject.

The steps in the research are described as follows: (1) initial observations at the school as a research location , namely at SMA Negeri 2 Rantau Utara, Labuhanbatu Regency ; (2) preparing research proposals on the basis of using literature studies , (3) determining the research sample using *purposive sampling technique* from the population ; (4) making instruments in the form of questionnaires on student learning motivation ; (5) the instrument was tested to obtain valid statements so that it is suitable for use in research ; (6) validation of the questionnaire instrument to expert validators (expert lecturers) ; (7) conducting research by distributing valid questionnaires based on instrument trials and validation from experts ; (8) collect data on student learning motivation ; (9) data processing using an assessment rubric on student motivation using *a Likert scale* ; (10) a data analysis using the *SPSS application* .

The research instrument used a questionnaire or questionnaire. Questionnaires are data collection instruments in the form of statements, which are compiled and then handed over to students. The questionnaire contains 20 statement questions with alternative answers in the form of a Likert scal. The alternative choices are between 1 to 5 with gradations 5 namely Strongly Agree (SS), 4 namely Agree (S), 3 namely Undecided (Rg), 2 namely Disagree (TS), and 1 namely Strongly Disagree (STS) . The data collection

technique used next is interview. Interviews are an important part of addressing and concluding additional arguments based on factual data in the field obtained from Biology teachers to be able to complete discussions and conclusions in a study. The last collection of data is documentation in the form of research photos as evidence of research or research.

Data analysis techniques were carried out using descriptive. Descriptive analysis was carried out to obtain an overview of the criteria for the distribution of values from each data variable of student learning motivation. This includes the average value, standard deviation, minimum value and maximum value as statistical description data . Tests were carried out using descriptive statistics in this study as a whole for data testing and frequency description testing using the *Statistical Product and Service Solutions* (SPSS) application .

## FINDINGS AND DISCUSSION

Based on the results of data analysis, it was obtained data on student learning motivation in the matter of the digestive system of humans in class XI SMA Negeri 2 Rantau Utara. The research results are described as follows.

### *Animated Display on Human Digestive System Material*

The material presented in this Biology learning media is the Digestive and Respiratory Systems in Class XI Humans Semester II. Presentation of material is presented in a language that can motivate students and learn and create an interactive learning atmosphere. The material presented is learning material that contains material about the disciplines being taught , learning videos, glossaries, practice questions, and other additional displays such as and bibliography. The display of the food digestive system material menu in humans in the teaching media can be seen in Figure 1 below.



Figure 1. Display Menu on Human Food Digestive System Material

Disciplinary material and is supported by language that can make students more interactive in the learning process. From this media, it can be used as a learning CD that can be used by teachers and students independently or studied classically in the classroom as usual in learning to increase student learning motivation.

**Description of Animation-Based Learning Motivation on the Material of the Human Digestive System for Class XI IPA**

Based on the results of the research and analysis that has been carried out to determine the learning motivation of students in class XI SMA Negeri 2 Rantau Utara. The details of these values can be seen in the following table.

Table 2 . Frequency Descriptive Results

	XI_1	XI_2	XI_3
N	35	35	35
Valid missing	0	0	0
Means	82.09	72,31	64,77
std. Deviation	11,564	8,457	11,790
Minimum	51	42	44
Maximum	96	88	81

Based on the table above, it was found that the average value of students' learning motivation in class XI IPA 1 was 35 people who stated that students' learning motivation was very good. While the learning motivation of students in class XI IPA 2 and XI IPA 3 each of 35 people was stated to have good student learning motivation.

To make it easier to see the differences in learning motivation in each class XI IPA at SMA Negeri 2 Rantau Utara can be seen in Figure 2 below.

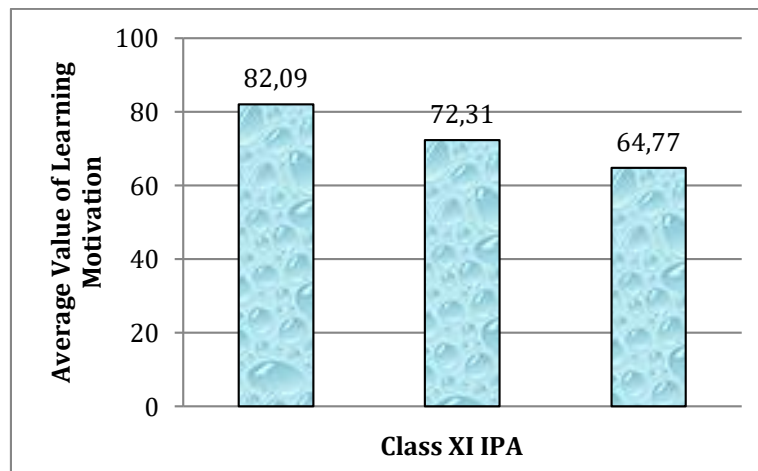


Figure 2. Learning Motivation of Class XI Science Students at SMA Negeri 2 Rantau Utara

**Description of Animation-Based Learning Motivation on Human Digestive System Material Class XI IPA at SMA Negeri 2 Rantau Utara Based on Indicators**

Survey results and metric-based analysis to determine student motivation. Details of the indicators of student learning motivation results are presented in the following table.

Table 3 . Frequency Descriptive Results

		Tenacious_Fac				
		Tekun_Learn	e_Difficulties	Interest to learn	Achievement	Mandiri_Learning
N	Valid	105	105	105	105	105
	missing	0	0	0	0	0
Means		77.65	72.51	82.57	81,10	74,21
std. Deviation		15,553	8,544	11.023	11,899	9,523
Minimum		34	42	46	50	42
Maximum		96	90	97	96	94

Based on the table above, it was found that the average value of student learning motivation based on indicators for class XI IPA was 105 people, it was stated that student motivation in the indicator of persistence in learning was obtained 77.65 (good). While the indicator of tenacity in facing difficulties is 72.51 (good), the indicator of interest in learning is 82.57 (very good), the indicator of achievement in learning is obtained 81.10 (very good) and the independent indicator in learning is obtained 74.21 (good ).

Based on these indicators, the results of the study and analysis were carried out to determine the learning motivation of class XI IPA students at SMA Negeri 2 Rantau Utara. The average student learning motivation based on indicators can be seen in Figure 3 below.

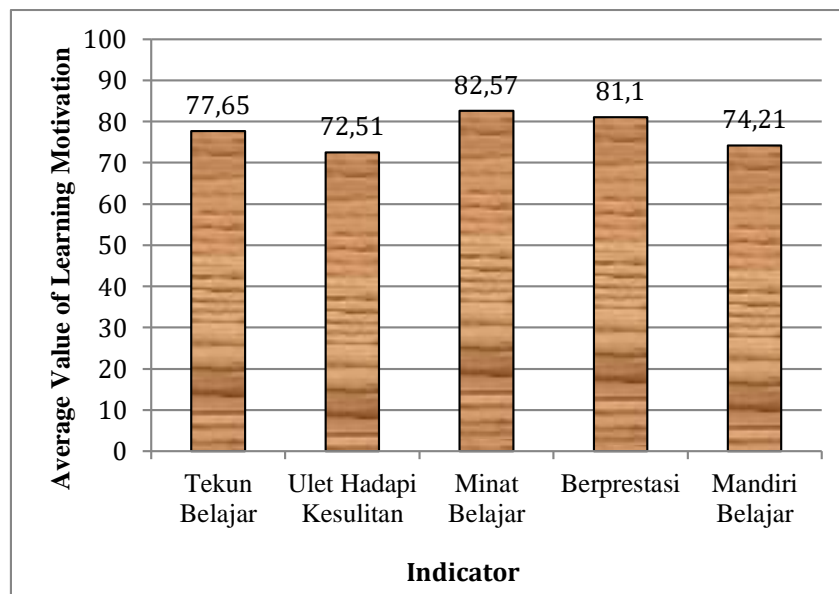


Figure 3. Student Learning Motivation Based on Indicators in Class XI IPA at SMA Negeri 2 Rantau Utara

**Discussion**

**Animation-Based Learning Motivation on the Material of the Human Digestive System Class XI IPA**

The learning motivation of class XI IPA students at SMA Negeri 2 Rantau Utara shows that out of 105 students it is classified as good in terms of motivation to learn at school. Student learning motivation that is classified as very good is class XI IPA 1 while



student learning motivation that is classified as good is class XI IPA 2 and class XI IPA 3. This is in accordance with the expected learning objectives. However, it should be realized that the teacher must innovate more in learning so that the learning system becomes even better. Innovative learning has several advantages from aspects of the nature of scientific inquiry. Therefore, teachers continue to develop and implement learning innovations such as interactive media in learning so that students become more enthusiastic about learning.

Student learning motivation and animated video media are very closely related in learning. The combination of audio and visual can provide a detailed explanation so that it can give a direct impression of what is being explained. This is in line with online learning which really needs audio-visual media in the learning process. The relationship between student motivation and the use of animation makes classroom learning more interactive. This situation is indicated by good and very good averages which are described in these categories. Learning motivation is significantly influenced by the use of learning media. Through learning media, especially in learning biology, students find it easier to understand learning material so that students have an interest in learning or can be said to be motivated to learn. Moreover, learning biology that requires teaching aids, such as learning the human digestive system, of course students cannot just hear the teacher's lecture or information conveyed orally by the teacher. Students need to be introduced to the organs related to the digestive system and the stages will be clear if shown directly. With the help of animation media, it creates a learning atmosphere that is not too stressful and boring because students are given media to watch events consisting of animated videos. One of them is learning with material about the food digestive system in order to attract students' interest and reduce student boredom, an animated video is needed for learning. Teachers are not only given assignments and grades, but can also be varied by using animated media.

The use of animated video media to create material about the human digestive system can provide positive motivation for students based on grades in each class. With the help of animated video media, students can observe more realistic material about the food process in the human body's digestive system, the video shows the process of food entering the mouth, how food is processed with the help of organs and enzymes in the mouth. Enzymes help in the digestive process, see how the body's organs are formed and assist in the digestive process until food becomes the body's energy source and waste is ready to leave the body. This shows that animated media can motivate and attract attention to take part in learning. Student interest in learning to use animated media is an internal motivation for students (Arimadona et al., 2022) states that motivation is a set of efforts aimed at creating certain conditions so that someone is willing and able to do something so that motivation can be motivated by external factors. It can be said that a person's learning motivation can be increased externally by providing something that makes the person focus on what he is learning, such as animated media when studying material about the human digestive system.

The advantages of animated media besides making it easier for teachers to convey learning material also make learning activities interesting and fun. It is mentioned (Rahmi, 2020) about how video media works, namely increasing motivation, efficiency and effectiveness in conveying information, arousing enthusiasm, preventing students from getting bored, then showing concrete and suggestive events. The purpose of suggestive is to make learning activities fun and make students addicted indirectly so that students are active in learning activities. Motivation is needed to improve academic

achievement. The educational process in schools is not effective if students do not want to learn. Readiness to learn motivates students so that what they learn is well received.

### ***Animation-Based Learning Motivation Based on Indicators***

Based on indicators, from 105 students obtained motivation to learn based on indicators in the good category. Based on these results, the highest indicator is an indicator of student learning interest in the very good category. The second highest indicator is the indicator of achievement in learning, namely the very good category. The third value order indicator is an indicator of perseverance in learning, namely the good category. The fourth value order indicator is an independent indicator in learning, namely the good category. Then the lowest order is an indicator of tenacity in facing difficulties in learning, namely the good category. This means that animated media can make children tenacious in facing problems or able to solve problems painstakingly.

The high motivation of students towards indicators of fun activity in learning is due to the use of animated media during the learning process. Previously, animation media had never been used for digestion material. During the learning process, it was observed that students enthusiastically participated in learning using the animation media used by the teacher so as to create an active and fun atmosphere in the classroom. This is in line with the view expressed by (Kışoğlu, 2018) who argues that increasing student learning motivation must first create a sense of joy in learning, and cause pleasure for students, namely through the use of animated media in learning.

Animation media is very effective in helping learning systems to explore science and technology content in depth. The use of animated media can make students focus on observing learning, cooperation and communication between students and teaching staff can be improved in classroom learning (Hugerat, 2021). The use of animated media in learning increases students' motivation in learning and creates a more active and lively learning atmosphere, where video transmission allows students to better understand the human digestive system material delivered in a way that motivates students while learning. The above shows that animated media can create learning activities that are interesting and conducive to learning.

Animation media in learning is a big reason for growing interest in learning and the level of success in the classroom. Animated tools can show the processes that occur in the digestive system. Through animation media that can display moving images and produce sound, students become focused and concentrate on listening to learning material and associating existing knowledge which can then be communicated in the classroom so as to create a scientific atmosphere in learning. This opinion is supported by (Allen, 2006) who found that learning is more meaningful when it involves many senses. Students are more interested in listening to the material presented, so students want to solve their own problems. The use of animated media is very effective in keeping students' attention from the start of learning to the closing activities of learning. Information obtained by students in visual and auditory forms in educational media can support student memory. The animation tool has succeeded in providing a psychological function which is then used as a student motive or encouragement for students to be more diligent in learning. Indicators of study persistence and determination as a result of independent learning. It refers to the use of animation tools in teaching students. Animation media can stimulate student learning motivation in animated media. Motivation, reason, will that makes a person act or appear to meet their learning needs. Motivation occurs in a person when there is something that pushes so that a kind of power is created for that person to act or

act, in other words behavior is motivated by motivation. This shows that live media can generate learning motivation to be more diligent, persistent in facing difficulties, high learning interest to succeed in school and learn to work independently.

Teachers should encourage students to develop better character in school disciplines. Teachers can change this bad attitude by applying effective and innovative methods that suit students' personalities to facilitate understanding of material about the human digestive system, so that students feel happy while learning. Presenting engaging and engaging content increases reader interest in the material, enabling engagement and interest. Teachers can change students who behave badly into very good people by providing optimal motivation and guidance (Setiyaningrum, 2013). Therefore, teachers should encourage students to develop better character while studying at school.

## CONCLUSION

Media animation of the human digestive system class XI IPA SMA Negeri 2 Rantau Utara resulted in good student learning motivation. The average value given to each class is Class XI IPA 1 of 82.09 in the Very Good category. In class XI IPA 2 get a score of 72.31 in good class. While Class XI got IPA 3 64.77 in good category. The motivation to study animation on the human digestive system material for class XI IPA SMA Negeri 2 Rantau Utara is considered good based on indicators. Student learning motivation, based on the indicators on each indicator which is given as the highest indicator, the student learning interest indicator is 82.57 in the "very good" category. The second highest indicator is the effectiveness indicator in training, which is 81.10 points in the very good category. The third value order indicator is an indicator of active learning in the good category of 77.65. The fourth value order indicator is an independent learning indicator which has 74.21 points in the "good" category. Then the lowest score of the persistence indicator of learning difficulties is the average score of 72.51 in the good category. It is hoped that future researchers can develop the results of this research to enrich research in other topics and level for biology or science in general.

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