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The Effectiveness of Using Conceptual Instruction (ICI) Approach Toward The Concept Mastery Based on Classroom Activity and Learning Style

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Abstract: This research aims to analyze (1) the effect of learning media on concept mastery, (2) the effect of learning activities on concept mastery, and (3) the effect of learning style on concept mastery. This quasi-experiment used a 2x2x2 factorial design. The sample consisted of 236 fourth-grade students of public elementary schools in Laweyan District, Surakarta, Indonesia, who were selected using the stratified cluster random sampling technique. The instruments used included an open essay test, an observation sheet of learning activities, and a learning style questionnaire. The prerequisite tests include normality, homogeneity, and balance tests. The hypotheses were tested using three-way Anova. The results showed that (1) video media is more effective in increasing mastery of concepts, (2) high and low learning activities do not influence the mastery of concepts, and (3) visual and auditorial learning style do not influence the mastery of concepts.

Keywords: Interactive conceptual instructions, concept mastery, instructionel media, learning style, and learning activity.

Introduction

Learning by understanding concepts is an activity of students to make changes to concepts by accommodating new ideas (Aslan & Demircioğlu, 2014). A student who has the goal of mastery is usually interested in learning with that goal alone e.g. "one of my goals in class for learning is to understand as much as I can" (Sedrakyan et al., 2018). The level of concept mastery of the students depends on the time needed to learn concepts or skills in ideal instructional conditions. If the instruction has a high quality, students will easily understand and may need a little time to learn; conversely, if the quality of instruction is low, students will find it difficult to understand and need a long time to learn (Guskey, 2015).

Mastery of concepts is a measure of the time needed for children to learn concepts or skills in ideal instructional conditions (Guskey, 2015). Mastery of concepts also means an underlying mechanism for meaningful learning or deep learning (Farrokhnia et al., 2019). Some students often find difficulties understanding several concepts (Buber & Unal, 2017). Aspects of student's concept mastery follow their cognitive levels, remembering, understanding, applying, analyzing, evaluating, and creating (Anderson & Krathwohl, 2010).

Based on the pre-observations in several elementary schools, it was found that most students wasted their time with endless repetition and did not produce anything for their learning process with ineffective results. They were less encouraged to develop their thinking skills, which made them only able to remember what they had learned and not know how to apply the knowledge. According to Disessa, (2014), many students failed to integrate several related concepts because they experience misunderstanding about the same principle consistently and repeatedly. Wrong concepts allow the students to see a direct

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relationship between the final concept and the lack of knowledge that extends to several aspects (Sands, 2014). This is in line with the opinion of Sawyer, (2018) stating that misconceptions occur due to a lack of basic knowledge.

Thus, it is not surprising that the results of the Trend in International Mathematics and Science Study (TIMSS) and Program for International Student Assessment (PISA) in 2007-2012 show that the mastery of science concepts of Indonesian students is still low. Some research has been conducted to overcome student's low concept mastery (Erol & Adile, 2017) by applying the learning approach and using instructional media.

Various attempts were made by implementing specific strategies to improve learning abilities and success (Tsai, 2018) The most effective learning approach is by involving students in developing their projects rather than receiving knowledge that is only explained by the teacher (Erol & Adile, 2017). In addition to the learning approach, we need an instructional media that is attractive and can arouse students' curiosity in the learning material that affects their learning activities. Therefore, the application of an interactive conceptual learning approach with instructional media is necessary.

The Interactive Conceptual Instructional (ICI) approach has four characteristics: (1) conceptual focus, (2) class interaction, (3) research-based materials, and (4) use of texts (Savinainen & Scott, 2002b). The research results of (Patriot et al., 2017) related to the implementation of the ICI approach show that the use of this learning approach significantly improves students' concept mastery.

In this approach, in exploring the concept, the teacher with the students do demonstrations related to the material to be studied. The use of instructional media in the form of videos and images in the use of text stage can clarify the presentation of ideas in concluding a learning concept. Demonstration activities form an arena where students can experience the importance and meaning of inquiry (Graham et al., 2016). Students must be equipped with sufficient thinking skills to answer questions (Taylor & Rahmawati, 2019). Experience and learning in scientific activities can open the way to explore a concept.

The instructional media in the form of videos and images is used as a means to sharpen the explanation of the demonstration activities and replace the role of teaching aids, especially those that are not possible to demonstrate in front of the class either due to the tools that are difficult to construct or they are very expensive and rare. One of the advantages of video media is that students can hear as well as see (Barani et al., 2010). The video media gives more time for students to respond and ponder what they read or observe and also provides a narrower view of classroom interactions and the inquiry more focused on the students' thinking (Castro et al., 2018). The picture media makes it easier not only to recognize and process but also to remember and understand than words (Baker & Adams, 2015) The advantages of picture media are helping to maintain the concept permanently, providing a complete example for conceptual thinking, creating an attractive environment, and giving direct experience to students (Shabiralyani et al., 2015; X. Wang et al., 2017).

The success of the learning process is seen from the ability of the concepts achieved by students. Meanwhile, the success of the teaching and learning process is inseparable from the learning styles of students. A teacher must consider the characteristics of each student in learning to be able to determine the right method in achieving optimal learning. Someone who is forced to learn something by methods that are not his learning style may feel depressed and frustrated. When someone understands learning styles, he will integrate into the learning process to achieve better understanding and easier to get success (Gilakjani, 2012).

Marzo et al., (2016) state that the diversity of learning styles, when well understood by students and educators, can be converted into appropriate teaching and learning methods. According to (Khalid et al., 2013), it is essential to know and be used as a reference to be more sensitive to students' basic needs. Educators need to know students' learning styles to adapt teaching instructions to students (Norris & Yeghiazarian, 2015; Sunggingwati & Haviluddin, 2019). For students, knowing learning styles can be useful if they

consider how and when they learn, as part of a reflective, metacognitive process, with actions to follow.

Identifying learning styles helps explore learners' weaknesses and strengths about their learning experiences and makes students inclined to learn easily and permanently (Santo et al., 2015). When learning styles are identified and considered in planning, it facilitates learning, opens up learning processes, and teaching becomes more effectively and efficiently (Chimmalgi, 2018). Each student is characterized by their learning styles, their preferred way to see, process, and understand information. Learning styles can be changed during the learning process (Aissaoui et al., 2019). Learning styles are an individual's tendency to adopt strategies in receiving, collecting, organizing, and processing information in the learning process (Mohaffyza et al., 2014). Knowing their own learning styles can assist individual to develop their engagement with various teaching and learning activities in the curriculum, and can support the individual's professional lifelong learning (Yorganci, 2018).

According to B and Hernacki, (2011), there are three types of learning styles i.e. visual, auditory, and kinesthetic. These three types are distinguished based on the students' tendency to understand and capture information more easily using their vision, hearing, or by doing it themselves. At first, humans are mostly visual learners and tend to have one learning style. This is as mentioned by (B & Hernacki, 2011) that, in reality, we have all three learning styles, but only one is dominant. All students with all learning styles have the same opportunity to obtain good learning outcomes.

Active learning forces students to reflect on and respond to a problem by involving them in research practices based on activities. Students not only listen to presentations but, at the same time, also improve their skills through practice, analyze, and evaluate the knowledge they have acquired (Vidermanova & Vallo, 2015). Learning will not occur if there is no activity; without activity, the learning process might not take place perfectly. Activities play an important role in learning because learning is a change of behavior that is relatively constant and is done intentionally.

This research is relevant to that conducted by Aslan & Demircioğlu, (2014) showing that video with conceptual changes is an effective way to improve mastery of concepts. This is in line with the research conducted by van Es et al., (2014) showing that the use of video-based mobile facilities can improve students' mastery of concepts. The previous research still focused only on science and mathematics while the material to be examined in this study is integrated thematic. The field of study studied includes all integrated material. Learning is focused on not only one subject but a mapping of four subjects into one unit of theme (Fauziah et al., 2020). This research is still new because some previous research has never combined both learning media with the same approach, Interactive Conceptual Instruction. Application of the ICI approach which is still rarely done because many previous researchers only measured the mastery of concepts without using learning approaches and media. The combination of the ICI learning approach with video and picture media will produce new information about students' mastery of concepts.

Based on the explanation above, this research is entitled The Effectiveness of the Interactive Conceptual Instruction (ICI) approach on elementary mastery of concepts. The problems of the research are formulated as follows: (1) which learning media (video or picture) is more effective for students' mastery of concepts; (2) which learning activity (high or low activities) better influences students' mastery of concept; (3) which learning style (visual or auditory) better influences students' mastery of concept; and (4) which interaction between learning media, learning activities, and learning styles better influences students' mastery of concepts.

Materials and Methods

This research employed a quasi-experiment with a 2x2x2 factorial design with unequal cells assisted by SPSS software version 21. This research was conducted in 8 public elementary schools in Surakarta City, Indonesia in the odd semester of

the 2019/2020 academic year. A total of 4 classes were made the experimental class I which applied ICI learning with video media while the other 4 classes were made the experimental class II which applied ICI learning with picture media. The ICI approach was applied in 8 out of 18 learnings in one theme.

The dependent variable in this research is concept mastery, the independent variable is the use of video and picture media in the ICI approach, and the moderating variables are learning activities and learning styles. Student learning activities are divided into high and low, the student learning styles are divided into visual and auditory learning styles, and the use of instructional media is divided into picture media and video in the ICI approach.
The media used in this research are videos and pictures about the energy source material, changes in form of energy, and alternative energy sources. The video displayed has a high-quality picture and sound when deepening the material, and the pictures are shared with each group. Researchers only use the movie maker application to edit videos with video duration of 30 minutes.

The image media used contains images of the energy source material, changes in form of energy, and alternative energy sources. Each group gets a picture of 3-4 sheets printed on A3 paper size with a high image quality so that it is clear and can be understood by the students. Video and image media used in each learning adapted to the material of each learning. This study uses the Theme 2 "Always Save Energy" which contains 3 sub-themes (energy sources, energy benefits, and alternative energy). The ICI approach was applied in 8 out of 18 learnings in one theme.

The concept mastery was measured before and after the treatment. Student learning activities were obtained from an observation sheet consisting of several indicators including visual, oral, listening, written, mental, and emotional aspects as measured by an assessment scale. Student learning styles were determined from the results of the questionnaires after the treatment. This research used a three-way ANOVA with a 2x2x2 factorial design presented in Table 1.

Table 1. Design factorial 2x2x2

		Instructional Media	
		Picture (A_1)	Video (A_2)
High Learning Activity (B_1)	Visual Learning Style (C_1)	$A_1B_1C_1$	$A_2B_1C_1$
	Auditory Learning Style (C_2)	$A_1B_1C_2$	$A_2B_1C_2$
Low Learning Activity (B_2)	Visual Learning Style (C_1)	$A_1B_2C_1$	$A_2B_2C_1$
	Auditory Learning Style (C_2)	$A_1B_2C_2$	$A_2B_2C_2$

The population in this research was 700 fourth-grade students of public elementary schools in Laweyan District, Surakarta, Indonesia in the 2019/2020 academic year, who were selected using stratified cluster random sampling or random class sampling. The sampling steps included (1) creating population strata (high, medium, and low) based on national examination ranking and (2) categorizing the schools into high, medium, and low and selecting three schools from each category. 4 elementary schools were made the experimental class I and 4 as the experimental class II which already represented each category. The samples used in this research were taken from the high, medium, and low school categories based on the school rankings in the 2018 National Examination.

Representative sampling was done using tables to determine the number of samples with the formula of Isaac & Michael (Sugiyono, 2014) "with a significance level of 1%, 5%, and 10%" as shown in Table 2.

Table 2. List of Sampling Tables by Isaac and Michael

N	I		
	1%	5%	10%
700	341	233	195

This research uses a significance level of 5%. Based on Table 2, the minimum sample is 233 students, and 236 samples of the fourth-gradestudents of elementary school were grouped into the experimental groups I and II. In this study consisted of 2 experimental groups which were distinguished. The experimental group I consisted of 4 elementary schools applying the ICI approach with video media while the experimental group II

consisted of 4 elementary schools applying the ICI approach with video media. The use of video and image media is applied in the ICI stage, namely "use of text".

The data collection techniques included test and non-test techniques. The test instrument for measuring concept mastery was an essay test with only four of the six cognitive domains classified by Bloom (Anderson, 2010), including aspects of remembering (C1), understanding (C2), analyzing (C4), and creating (C6). The non-test technique included learning activity and learning style questionnaires.

The types of non-test techniques used are observation sheets and questionnaires. The instruments used to collect the data on learning activities and learning styles are observation sheets of learning activities and questionnaire sheets containing several written questions used to obtain information from the subjects related to some characteristics of their learning styles.

Results and Discussion

The statistic used in this research is the three-way Analysis of Variance (ANOVA) with unequal cells. The ANOVA test was carried out to compare the average scores of each treatment (William R. Shadish et al., 2002). The ANOVA test is one of the parametric tests which assumes data normality, homogeneity, and independence. Therefore, as the prerequisite, the group normality test was performed on the posttest data using Kolmogorov-Smirnov statistics. Besides, a homogeneity variance group test was also performed using Levene statistics (Peck, 2012). After the ANOVA test has been performed, if there is an effect, a post hoc test is carried out using the Schefee test.

Table 3. Results of Normality Test on the Data of Concept Mastery, Learning Styles, and Learning Activities

Score	Media	Sig.
Posttest (Concept Mastery)	Video	0.106
	Picture	0.354
Learning Style	Visual	0.213
	Auditory	0.136
Learning Activity	High	0.192
	Low	0.539

Based on Table 3, a summary of the results of the normality test of concept mastery on all variables, according to Kolmogorov-Smirnov, the sig. value of P is ≥ 0.05 so that the entire data are declared to be normally distributed. This means that students' mastery of concepts for instructional media, learning style, and learning activity factors come from populations that are normally distributed.

Table 4. Reults of Homogenity Test on the Data of Concept Mastery, Learning Styles, and Learning Activities

Score	Sig.
Posttest (Concept Mastery)	0.585
Learning Style	0.131
Learning Activity	0.871

Based on Table 4, the homogeneity test results in a sig. value ≥ 0.05 for all variables, which means all data are homogeneous. It can be concluded that the concept mastery, learning styles, and learning activities come from a homogeneous population. The Sig. value The Levene's Test for Equality of Variance in the same variant is assumed in Table 5 which is 0.964 > 0.05, which means that the data variance between video and picture media classes is the same. The Sig. value (2-Tailed) is 0.194 > 0.05, then H_0 is accepted. Thus, it can be concluded that the classes with video and picture media have the same concept mastery ability.

Table 5. Result of Balance Test

Independent Samples Test										
		Levene Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Pretest	Equal variances assumed	.002	.964	1.301	234	.194	2.332	1.792	-1.199	5.863
	Equal variances not assumed			1.301	233.985	.194	2.332	1.792	-1.199	5.863

The factorial design used in this research was the 2x2x2 formula. This analysis is aimed at examining the effect of the independent variable on

the dependent variable. Hypothesis testing was carried out with the following steps: (1) determining the research hypotheses, (2) determining the test statistical method, (3) determining the level of significance, (4) determining test decisions, and (5) comparing the mean of hypotheses. If p-value > 0.05, then H_0 is accepted and vice versa.

Pretest and Posttest Data on Concept Mastery

The concept mastery data were obtained from the pretest and posttest. Details of the pretest and posttest data on the concept mastery can be seen in Table 6.

Table 6. Description of Pretest and Posttest Data on Concept Mastery

Data	Experimental Class	N	Max	Min	Mean	Std. Deviation
Pretest	Video	119	97	48	67.92	13.827
	Picture	117	97	31	70.25	13.704
Posttest	Video	119	95	70	80.19	5.124
	Picture	117	94	60	76.87	5.684

Based on Table 6, after learning with video and picture media, it was found that the average concept mastery of students with video media is higher than image media. The student learning activity data were obtained from the questionnaire sheets with assessment descriptors with certain criteria. The high and low learning activity data were obtained from the average score obtained from all samples. The description of the learning activity data can be seen in Table 7.

Table 7. Description of Learning Activity Data

Data	Video Media				Picture Media			
	N	%	Mean	Std. Deviation	N	%	Mean	Std. Deviation
High	63	52.94	80.78	5.244	64	54.7	77	5.609
Low	56	47.06	79.54	4.951	53	45.3	76.72	5.822

Based on the description above, it was found that in the video media class, the frequency of students with high learning activities is more than that of students with low learning activities. The student learning style data were obtained before the treatment during the learning process through the visual, auditory, and kinesthetic learning style questionnaires. The data used in this research included visual and auditory data. The description of the student learning style data can be seen in Table 8.

Table 8. Description of Learning Style Data

Data	Video Media				Picture Media			
	N	%	Mean	Std. Deviation	N	%	Mean	Std. Deviation
Visual	59	49.58	79.73	5.071	59	50.43	78.31	5.096
Auditory	60	50.42	80.65	5.178	58	49.57	75.41	5.918

The description above informs that 95 students from the picture media class have a visual learning style and 60 students have an auditory learning style, while in the multimedia class, there are 59 students with a visual learning style and 58 students with an auditory learning style.

Based on the normality, homogeneity, and balance tests, we can see that the analysis prerequisites have been fulfilled. The data obtained were analyzed using SPSS 21 with computation calculated with Tests of Between-Subjects Effects. Based on the test results above, if the p-value > 0.05, the null hypothesis is accepted; meanwhile, if the p-value < 0.05, the null hypothesis is rejected. The Summary of Anova Results of Concept Mastery, Learning Style, and Learning Activity The results of the three-way ANOVA hypothesis test in detail can be seen in the following Table 9.

Table 9. ANOVA Test Decision

Tests of Between-Subjects Effects

Dependent Variable: Concept Mastery

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Decision
Media	625,645	1	625,645	22,268	**.000**	H_0 is rejected
Activity	32,747	1	32,747	1,166	.281	H_0 is accepted
Force	61,241	1	61,241	2,180	.141	H_0 is accepted
Media*Activity	16,456	1	16,456	.586	.445	H_0 is accepted
Media*Style	242,088	1	242,088	8,617	**.004**	H_0 is rejected
Activity*Style	10,582	1	10,582	.377	.540	H_0 is accepted
Media*Activity*Style	111,397	1	111,397	3,965	**.048**	H_0 is rejected

Discussion

The Effect of the Use of Instructional Media on Concept Mastery

Based on Table 9, the results of the SPSS 21 analysis with computation calculated by Tests of Between-Subjects Effects show a significance level of 0.000, smaller than 0.05, which means that H0 is rejected or H1 is accepted. This shows that learning media influences concept mastery. Based on the results of the analysis of the average concept mastery in Table 6, the average score for the concept mastery through the ICI approach with video media is 80.19 while the picture media is 76.87. There is a very significant difference in the average scores of students.

Instructional media can increase the attention of students towards learning. The use of video media in learning is very influential on the understanding and ease of absorption of learning materials because one of the advantages of video media is that students not only listen but also see (Barani et al., 2010). Meyer et al., (2019) concluded that motion videos are more focused on deepening the analysis so that learning is more challenging to think from time to time.

In the first stage of conceptual focus, students observed the demonstration done by the teacher or students as discussion material for other students. The teacher provided guidance and plans for learning so that the achievement of the material could be conveyed to the maximum. Without guidance and investigation activities, students become shallow so that the teacher facilitates learning by exploring basic principles (Çaliskan, 2011) or developing a deep understanding of coherent understanding (M. M. Wang et al., 2016). Bustillo and Garaizar, (2016) emphasize that it is necessary to provide students with opportunities for creation because it converts abstract concepts into concrete and concepts that are well understood. It was stated that the skills requiring spatial thinking such as using materials of different shapes, building various structures with blocks, and reaching to the whole by combining different parts form an important basis in school readiness (Toran et al., 2015; Verdine et al., 2014).

In the second stage of class interaction, students were given the opportunity to discuss solving problems given by the teacher through inquiry. Discussion activities can increase practitioners' success, teach orientation, and learn how to plan inquiry-based lessons (Yukselturk & Altiok, 2016). Discussion can also increase conceptual understanding at a higher level (Marcelino et al., 2018; Tsai, 2018).

In the third stage, the use of research-based teaching materials served to improve students' mastery of concepts and overcome student difficulties in learning concepts. At this stage, the teacher gave questions and feedback verbally to ensure the level of understanding and mastery of the concepts the students had. The purpose of feedback is to design information systems and improve awareness processes during the learning process (Sedrakyan et al., 2018). The feedback can be built based on the learning profile of the regulatory process phase, including planning, monitoring, and activities so that it is possible to detect inefficient processes of learning to adapt.

In the fourth stage of the use of text, students conducted material deepening activities by paying attention again to the summary of learning material that had been implemented in the learning video and picture media. The use of mobile facilities supports teachers to make connections with broader learning principles and an emphasis on cognitive knowledge (Tekkumru-kisa & Stein, 2017). The media used in this research are videos and pictures with the energy source material, changes in the form of energy, and alternative energy sources. The video displayed has a high-quality picture and sound when deepening the material, and the pictures are shared with each group. Each group gets a picture of 3-4 sheets printed on A3 paper size with a high image quality so that it is clear and can be understood by the students.

Learning with video media has a higher visualization value than with picture media. Instructional video media can prepare students to access their own knowledge, manage their interpersonal interactions, and increase the potential to build their knowledge (DeLozier & Rhodes, 2016). Video media also provides information that represents a real situation, and the students can select the information that they experience directly. The research conducted by (van Es et al., 2014) shows that the use of video-based motion facilities can enhance discussions that affect the students' concept mastery.

This result is in line with the hypothesis proposed by the researcher that the video media gives more time for students to respond and ponder what they read or observe, as well as provides a narrower view of classroom interactions and the inquiry more focused on the students' thinking (Castro et al., 2018). One of the advantages of video media is that students can hear as well as see (Barani et al., 2010). This is also supported by Castro et al., (2018) mentioning that

video media can stimulate students to respond to what they read or observe, make investigations more focused, and create an interaction between students and the teacher in class.

Interactive conceptual learning with video and picture media influences student's concept mastery. The student's level of concept mastery depends on the time needed to learn concepts or skills in ideal instructional conditions. If the instruction has a high quality, students will easily understand and may need a little time to learn; conversely, if it is low, they will find it difficult to understand and need a long time to learn (Guskey, 2015).

The difference between the concept mastery using ICI with video and picture media is because, with the video media, the learning material can be presented more interestingly, the learning atmosphere becomes more relaxed, and the students become more curious with the material, which leads to more meaningful and real-life learning. Real-life learning can stimulate the student's imagination better to understand the learning material delivered.

van Es et al., (2014) argue that the use of motion facilities provides an opportunity for teachers to critically analyze and discuss what they notice from the video. This is indeed very influential on the student's concept mastery; in other words, this is what makes video media have more influence on the student's concept mastery compared to the picture media that only displays still images without audio-visuals, which make students less interested and their imagination to interpret the material received not optimal.

This is in line with the research by Chittaro, (2017) stating that the use of video media has a better effect than picture media in the learning process of story-writing skills. Video media can describe a process precisely and can be watched repeatedly if needed. This is in line with the research conducted by (Zhang et al., 2020) also state that video media is effective in improving student's conceptual understanding, learning motivation, and learning outcomes. The ICI approach with video media produces a higher average score than with image media because video media stimulates multiple senses and explains abstract concepts using a combination of visuals, texts, sounds, and music. It also improves the student's cognitive processes and learning performance (Lei et al., 2015).

The Effect of Learning Activity on Concept Mastery

The result of the analysis calculated by Tests of Between-Subjects Effects shows a significance level of 0.281, smaller than 0.05, which means that H0 is rejected or H1 is accepted. This shows that there is no influence between concept mastery and the high or low learning activities of the students. The average score of concept mastery with high learning activities is 78.87 and low learning activities is 78.16.

Some factors that influence student learning activities on concept mastery are differences in IQ or the level of intellectual intelligence of each student, facilities, and infrastructure, learning methods, and media. Students with high learning activities can listen well, write every new concept, solve problems, and dare to express their answers while those with low activities have a good concept mastery ability even though some activity indicators are less visible in learning. Therefore, during the test, the students with high learning activities obtain a similar score. The results of this research are relevant to those of Maduretno et al., (2016) stating that neither high nor low learning activities of students influence their learning achievements, in both knowledge and skill aspects.

Student learning activities were measured according to teacher observations in learning using Diedrich indicators which include visual, oral, listening, writing, mental, and emotional aspects. The teacher plays the role of systematically designing the learning system, thereby stimulating student activity in the learning process. Active participation of students is very influential in the process of development of thinking, emotions, and social. This is in line with the opinion of Nagayoshi & Nakamura, (2019) stating that ways to improve student involvement include allocating more time for teaching and learning activities and providing clear and precise teaching in accordance with the teaching objectives to be achieved.

The implementation of the assessment of student learning activities in the research is following the assessment indicators prepared, but the lack of a learning management system in recording and assessing the learning activities of each student increases the teacher burden. This is possible for only a few students who actively answer the questions during learning are recorded so that the effect indicators of learning activities on concept mastery are less visible. This is what causes differences in the results of research conducted by (Gil-Jaurena & Kucina Softic, 2016) showing that learning activities are an important predictor in the academic determination of children. This is in line with the research conducted by (Guerrero-Roldán & Noguera, 2018) that active learning activities are designed by focusing on students, for example, by grabbing their hands to participate in learning science and interacting with their friends to obtain meaningful knowledge.

The Effect of Learning Style on Concept Mastery

The result of the analysis calculated by Tests of Between-Subjects Effects shows a significance level of 0.141, smaller than 0.05, which means that H0 is accepted or H1 is rejected. This indicates that learning style influences concept mastery. From the comparison between the average scores of each learning style, the scores are similar. The average score of the concept mastery of the visual students is 79.01 and of the auditory students is 78.07.

A person's tendency to learn is very diverse and influenced by several things. The way a person absorbs, processes, and manifests information in a tangible form of their behaviors is called learning style/type. Everyone has a different learning style and typology; some can easily receive new information by listening directly from the source while others need to write or make a memo and need a demonstration. Teachers must distinguish study groups to meet the needs of each student (Guskey, 2015). The learning style trends in this research are visual and auditory.

This research uses picture media and multimedia as a treatment in learning and both are the instructional media that can facilitate students with a visual learning style. Each learning style has its own characteristics. The sense of sight (eyes) plays an important role in the visual learning style. Students who tend to have a visual learning style feel more comfortable in learning when the teacher brings teaching aids/media or directly brings them to visit the objects related to the concept being studied. The visual students are very concerned about their teacher's body language and facial expressions.

The auditory learning style relies on learning success through the sense of hearing (ears). Students with a dominant auditory learning style feel comfortable when learning with verbal discussion and listening to what the teacher says. Their learning outcomes are strongly influenced by the tone, pitch (high and low), and clarity of speech.

Turki, (2014) states that learning styles have implications for teaching practice although not only determined by students' learning styles. The use of instructional media that can accommodate students' learning styles is very necessary for learning. ICI learning with video and picture media involves visual and auditory learning styles even though each presentation is different. The use of video media in the ICI approach tends to activate the auditory learning style and the use of picture media tends to activate the visual learning style.

Humans are mostly visual learners and tend to have one learning style. This is following the opinion of (B & Hernacki, 2011) DePorter (2011) stating that, in reality, we have all three learning styles, but only one that is dominant. Students with all learning styles have the same opportunity to obtain good learning outcomes. This is why the results of this study indicate that there is no effect of learning styles on the concept mastery results of the students.

The results of this research are relevant to those of Mite et al., (2016) that there is no relationship between learning styles and student's learning outcomes at St. Mary's Catholic Senior High School Malang based on corrected scores in biology learning through group-investigation learning in Malang. This is contrary to the findings of (Bozkurt, 2013; Fan & Xiao, 2015), in their research, concluded that there was an interaction between

learning media and learning styles on student learning outcomes. Besides, Kolb and Kolb, (2013) states that learning style can influence performance on various types of assessment methods and improve team performance. Therefore, learning style does not influence concept mastery.

Conclusions

Based on the results of the hypothesis, it is significant: (1) video media is more effective in increasing mastery of concepts; (2) high and low learning activities do not influence the mastery of concepts; (3) visual and auditorial learning style do not influence the mastery of concepts; (4) the interaction of video media with high learning activities and auditory learning style has more influence on the mastery of concepts than other media, activities, and learning styles.

Based on the conclusions above, the researcher formulated several recommendations for teachers, schools, and future researchers. Teachers must improve their students' concept mastery by designing effective and innovative learning that is integrated with instructional media. The application of ICI approach with video media can improve students' mastery of concepts. In addition, teachers must pay attention to the level of student learning activities and learning styles of each student to determine the appropriate approach and learning media to accommodate the unique diversity of each student. The use of video media in the ICI approach activate the auditory learning style and the use of picture media activate the visual learning style. Schools must provide supporting learning facilities needed by teachers to develop their potentials, such as infrastructure and other facilities. Future researchers are expected to develop research with other variables such as learning motivation, creative-thinking skills, problem-solving skills, or other variables. They can also learn more up-to-date learning approaches and media, for example applying E-Learning-based interactive learning media programs (Moodle), websites (Zenius Education), Android applications (Quipper), etc.

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