

An Analysis of Technology Skills Based on Perspectives and Resident Locations for the Sports Science Students

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Abstract: Soft skill of technological capabilities for Sport Science Students are very important in learning science. This research wanted to analyze the stage of students' technology skills in learning science based on their perspectives and to compare it based on the location of students in Padang City. The method of study was quantitative research. The total sample is 449 Sport Science Students, they are 205 people from in the city, 141 from the border and 103 from the suburb. The proportional random sampling method selected the sample based on students' resident. Analysis of research used one-way ANOVA with multiple regression tests. The results showed that the phase of high technical skills of students was not different based on location but there were significant differences in students' technology skills based on their location, where students in the central of the city have higher skills than border and suburb. The result of the research showed that three independent variables such as the learning process, parent and peer support and learning motivation can contribute to increasing the students' technology skills with 27.7 percentages. The learning process gave a contribution of about 20.4 percentages, support parents and peers 5.7 percentages, and academic motivation was 1.6 percent. The implication of this study was to recommend sports science faculty want to design and improve students' academic motivation in the learning of science to concern the suitable condition with the student location.

Keywords: science, technology skills, sports science students

I. INTRODUCTION

The teaching of the scientific process to the sports faculty consisted of some implementations of the teaching model based on technology. Therefore, in this process argumentation is an important requirement to developing scientific knowledge because scientific learning does not only include how natural laws occurred or how the universe was existed but also focuses some explanations about how the is universe going to be in the future following the information technology development.

Thus, scientific learning starts a discussion about the main reasons for these facts and natural theories [1]. Regarding this mean, argumentation is a central role in science learning. Argumentation is an implementation of constructivism and according to constructivism, to improve inquisition and discussion in science learning, there should be a science program that includes the implementations of argumentation [2], [3]. However, it is known that argumentation applications are not used so much in science classes because of some reasons [2].

Learning science is not only learning how much to remember science content but also learn to master the science process skills and to apply them in a scientific investigation. Science process skills allow individuals to solve the problems they face in daily life as scientists do. Science process skills in science education are skills that make students active, give them to learn research methods and the responsibility and provide permanent learning. Science process skills are defined by different researchers. It divided science process skills into two groups as basic process skills and integrated process skills. Basic process skills include observing, classifying, measuring, using numbers, building the space-time relationship, predicting,

making the conclusion and communicating. Integrated process skills include identifying and controlling variables, hypothesizing and testing, operational identifying, planning and making the experiment and interpreting data [4], [5].

Laboratory activities are important for students to build their experiences and science concepts, gain problem-solving skills, work in co-operation and develop science process skills. Laboratory activities in science education allow students to provide meaningful learning, use science process skills and also recognize the process of how to build the knowledge they learn in science lessons [6].

Laboratories allow students to explain subjects, principles, processes, and experiments with samples by searching and inquiring [7], [8], [9]. In the laboratory, method learning takes place through senses. On the other hand, by applying scientific methods in laboratories, students gain scientific knowledge and develop problem-solving skills. Students learn how to design and pursue an experiment and reach the results by themselves [10]. Students use science process skills when they research in the laboratory. Previous researches present that laboratory method in science education is important to gain and develop science process skills [11], [12].

Many studies have been carried out and reported about the effective teaching and learning method. A good method can lead the motivation of student to learn the science, to attract students in learning science, increase the involvement of students actively in learning, motivate to learn and also improve their literacy and academic achievement in science [13], [14], [15]. In research Zurida et al. suggested that faculty should understand the

appropriate teaching and learning strategies for science concepts.

Among the suggested method of teaching science is a constructivist approach that explains how students develop the meaning in the process of getting the knowledge of science. The inquiry approach also involves students actively to improve their understanding related to scientific knowledge [16]. Con states science faculty need to exchange the traditional mode of teaching science just refers to curriculum only to integrated science teaching model by improving student's understanding of what they need to know [17].

The creativity development intended to logically creative skill, imagination and can provide a view of the focus of the curriculum charging in the 21st century besides the acquisition of knowledge and principle skill [18]. Innovative Creativity and productive is done to develop or customize the curriculum program effectively and efficiently [19].

Related to the explanation of the background mentioned above, the focus area of this research objective is to know the stage of students' technology skills based on their perspectives; to compare the technology skills based on student's location either central of city, border, and suburb; to observe the contribution of the process of science learning to student's technology skills in three locations observed. The hypotheses of this study to answer the formulation of the research are:

H_0 : There are no significant differences between students' technology skills and their locations

H_a : There is no significant contribution to the process of science learning on technological skills for the sports science students.

II. LITERATURE REVIEW

A. Science Learning Process

The process of learning science in schools, besides of using psychological theory based on personal constructivism and sociological perspective, which is based on social constructivism, investigators and education experts are now trying to use the theory of anthropological perspective. They are trying to look at the process of learning science in schools on environmental and cultural settings [20].

The studies were conducted refer to the assertion to student's owned cultural background (student prior belief and knowledge) and in the classroom during the process of learning to run, it plays very important role in the control of student mastery for the material [21], [22], [23], [24], [25], [26]. Then two years later, Ogunniyi et al. states that cultural background brought by faculty and students in the classroom, especially during science learning is crucial in the event or situational atmosphere of learning and teaching meaningful and contextual. In the same year [27], Baker and Taylor convey their decisions where they review specifically on the influence of culture in the process of learning science in the classroom [22]. Two important conclusions of their review are as follows. First, the failure of state-non-western countries to nationalize the science curriculum in schools is obvious. Second, they concluded that the cultural background of each student affects the way students in mastering science concepts were taught in

school. Specifically stated that the students' feelings and understanding in a society that is based on cultural participation and role in interpreting the absorption of new knowledge (science concepts).

Many studies have been undertaken to determine the effectiveness of learning by using laboratory activities in science education is to improve student achievement of their cognitive, affective and objective [28]. The learning environment was referring to the space reserved for learning both in the classroom, laboratory science, field or office [29]. There are two major components in the learning environment these are component and psychosocial components [30], [31]. Both these components complement each other in creating and shaping the learning environment that affects the learning process.

Science learning in schools mostly occurs in the laboratory [32], [33]. This happens because the laboratory has complete equipment and tools in the teaching process. In line with that, the laboratory has a good potency to engage students in authentic assessment where they can figure out their problems to be studied, establish procedures and make inferences [34]. In this environment, students can learn actively, working in small groups and continue to interact with the material or with a model of teaching to investigate the phenomenon of current science development [11]. Teaching and learning by using science laboratories can provide positive results in addition to improving students' attitudes and interest in science [35], [33], [11].

Funny teaching and learning will give the impression to the faculties and student satisfaction. In the context of the education as well, student and faculties satisfaction are influenced by environmental qualities of classroom setting [36]. According to Vygotsky's theory emphasizes that the social environment as good media for people to learn how a student interacts with the world of their environment, causing the transformation to occur in their minds. They develop responses and concepts as related to the environment. Therefore, the school is not only comprised of the physical structure of the buildings alone, but also an institution that promotes learning and realizing the feeling among educational citizens [37], [38].

B. Student's Interpersonal Relationships

The interpersonal relationships at school are very important for the process of learning activities and can realize a useful experience for students. Lev Vygotsky in his sociocultural theory has been put forward the concept of proximal development zone, which uses the term of scaffolding as a teaching strategy. Zone of proximal development is the distance between what students can create him/herself by learning so that they can be competent to assist the learning [37],[39]. Scaffolding teaching strategies provide support and assistance in the individual development zone of proximally based on one's students [40].

When Scaffolding runs, the faculties should provide a scaffolding model or support to enhance student's learning establishment. Scaffolding improves student found to advance their new knowledge. Activities are provided as scaffolding activities need students' effort

to perform their task alone [41]. If only one student can complete the task with the help of something, he is said to have been helped through the zone of proximal development in Scaffolding [42] Vygotsky defines Scaffolding as the role of faculty and others in supporting students in order to be able learning continuously [38]. Scaffolding is an important aspect of the temporary scaffold process. If students' motivation increased, Scaffolding is given faculties will be reduced, so that in the end the students can complete their tasks alone, without relying on others [40].

By the way, one goal of educators if using the Scaffolding approach is to aim to push the student to learn creatively and independently in teaching, it can be seen from the ability of students in solving any problem alone [43]. If one's knowledge increases, as well as learning to be more competent, one educator will slowly reduce the support that has been given.

According to Vygotsky, by using Scaffolding, faculty no longer need to be given because the student has formed a more sophisticated cognitive system in teaching science in the part of social support or scaffolding method in learning new material [39]. According to Tappan Scaffolding can provide the aim of learning obviously, and reduce the error of students in understanding the concept. Scaffolding can also help students understand why they were given the task of doing something and why the tasks are more important. Students can also refer to the resources to do the job when given by educators that aim to save time, reduce errors and circumvent the disappointment. [44].

C. Students' Motivation in Learning Science

Vygotsky with scaffolding theories helped educators expressed the principles of teaching and learning that has and is guiding the practice of teaching and learning in institutions of learning around the world. Although, there were still significant groups of students who are less successful and was not able to optimize the learning opportunities provided by these educational institutions.

Today are more leaders of education to recognize the importance of us to take the learning process by using scaffolding to stimulate student's motivation to learn independently as a key effort to improve the educational qualities. It means that the challenge of educational institutions today is to get to know their learning styles and appropriate method in improving student's academic achievement. Each practice the different learning styles.

Some students were more interested and inclined to learn on their own, while the other group is more inclined to the activity in the group. Besides, some students need clear guidelines before starting a project and there is also something students are willing to accept something publicly while gaining knowledge from various sources. Learning can occur through a variety of ways because of the way of observations and processing occur in humans are different. Some individuals can only see things concretely when others can see something in the abstract.

Sharifah Alwiah Alsagoff stated that the attitude of interest can drive student's attention to a single object / individual. It is so, if someone is interested, he will give

you the foundation that entirely to things that are of interest. So, in the implementation of the contextual approach, this aims to increase the motivation element by attracting students to think as an important strategy towards meaningful learning. Faculty are not important enough to continue of teaching and ensuring students have been willing to learn through increase their interest so that they are motivated and conscious of what will be learned [16].

According to Murray stated that motivation can be divided into two types, these are external motivation and internal motivational. Internal motivation is the desire that comes from within a person, while the External motivation is caused by a person's desire encouragement from outside [45]. If such motivation can be defined as the science literacy motivation comes from within to understand and know the science fields. Internal motivation and External motivation, both will influence each other, even motivational outcomes can improve internal motivation.

Feldman and Kearsley stated that theory of cognitive motivation, he said that in making the individual to be actively engaged and feel satisfied since the activity is undertaken not obtained the rewards in the form of objects [46], [8]. Literacy is essential for life, except for language acquisition, of communication, and also to develop the mind. Middley found that motivational changes caused by the characteristics of the learning environment experienced by students. Although it is difficult to know how exactly to motivate students, research shows that there are common dimensions that can be applied to most students [47]

Emphasis was given to the role of the faculties as a factor that sparked student motivation over the role of students itself in some trigger of student motivation goal theory focuses on the goals of students want to achieve something [48]. [49], [50], [51]. There is two commonly dealt goal orientation are task goals and objectives. The objective is that students in the learning program trying to improve their understanding. Students are characterized by more priority of task goal orientation about their progress in the development of their knowledge and skills. The aim of obtaining achievement is something related to the exposure. Student-goal oriented, feels the competition, like comparing with others, and believes that success is if they are successful in competing.

D. Attitude Towards Science

Attitude towards science has multi-dimensional nature, it is a neutral mental inventory follow the mixing action of experience to the stimulus given to him argued that more multi-dimensional attitude that includes: (a) attitudes toward science faculty, (b) anxiety toward science, (c) the interests of science in society, (d) concepts of science, (e) learning fun in science and (f) motivation in science. Educational experts argued that to inculcate scientific attitude and practice in the scientific method, teaching methods need to be given the opportunity of making Science [52].

Attitudes towards science mean students have found a positive attitude, they think that science and technology are important for them [53] According to Kamisah research related to the measurement of attitudes

toward science should involve aspects of the deity (monotheism) to measure the attitude of coherent and relevant to the philosophy of integrated science education curriculum [52].

The scientific attitude and a positive attitude towards science is sown direct result of the experience of students with science teaching and learning activities especially in activities that provide passage for the active involvement of students [51]. He said in the organization of science teaching pedagogy in the low position is critical and at the beginning of the establishment of the framework of strong evidence shows that students' attitudes are formed at the stage of higher education [53]. In research of Kamisah et al stated that the skills based on scientific evidence are the highest attitude held by students, in addition, the majority of the students involved in this study were students who are Muslims (58.8%) and based on evidence and honesty is a pure value and continue to be developed within them [53].

E. Technology Skill in Learning Science

Students will have a pool of skilled technology efficiency and caught in using technology for the benefit of themselves and society. The students' characteristics of the technology-skilled who have the knowledge and the feasibility of technical knowledge to carry out their tasks well. Technology can be developed to meet the needs of the locals. Norita and Zurida study found those students' attitudes and interests in the use of microcomputers in science education are positive.

Students admitted to the teaching computer-aid because the method can justify themselves, saving time and increasing student's motivation and attractive [34]. The integration of computer technology over the corresponding technology, faculty can help students establish a positive pattern of interaction during collaborative activities by using a computer. According to Waterman, Jr., Waterman and Collard in most organizations today need to have the endurance of labor, have the high dedication and ability to adapt their knowledge with the developments and changes that occur [9].

III. METHOD

This study used a survey method where the data was collected by using questionnaire and ended closed interview form. Population of this research are Sport Science Students of Padang State University who have different addresses location in Padang, those are City Center of Padang, Padang Pariaman, and Mentawai. To confirm the quantitative results, need interview sessions with faculty and students. Samples were determined by proportional random sampling-based zone of study with sample are 449 students where, 205 from central city of Padang, 141 from Padang Pariaman as the border area and 103 from Solok Selatan as the suburb.

During the pilot study, the focus was also on examining the suitability of the data gathering tools for the study. Quantitative data was collected from the evaluation result of students' level of technology skills achievement and the questionnaire consisted of questions related to: (1) learning science in the classroom, (2) learning science in the laboratory, (3) scientific literacy,

(4) gain support science learning materials, (5) support and guidance of faculty, (6) support from parents and peers; and (7) academic motivation.

The qualitative data in the form of documents, interviews, and observations were gathered together. Interviews were conducted to identify the students' views and perceptions towards scientific research and technology. Interviews towards Views and Perceptions of Scientific Research: Interviews were conducted to identify the students' views and faculty. The opinions of two faculty members and two sport trainers were asked to ensure the validity of the interview form developed by the researcher, and revisions were made. NSES's steps of doing scientific research (National Science Education Standards, 2016) were considered in preparing the questions.

Data analysis technique used descriptive analysis, inferential analysis, one-way ANOVA analysis and multiple regression tests. The data obtained from the achievement tests were analyzed using SPSS 15 with a significance level of $\alpha = .05$. The analysis of qualitative data was obtained from the interviews on the students' and faculties responses towards the students' learning science process in scientific research and technology where faculties and student were analyzed through content analysis. In the content analysis, the codes were combined under certain categories to make these codes meaningful.

IV. RESULTS AND DISCUSSION

To answer the first question: What stage of students' technology skills based on their location. Overall students' technology skills stage show at high stage (Mean = 3.98, SD = 0:39), students' technology skills who live in central of city (Mean = 4,08; SD = 0.44), students' technology skills who live in border area (Mean = 3.96; SD = 0.39) and students' technology skills who live in suburb (Mean = 3.93; SD = 0.34), like Table 1. Qualitative analysis to substantiate these results can be seen by interviewing session, here student shows that they already have the technology skills although simple technologies.

Table 1
Stage of Sport Science Students' Technology Skills Based on Residence

Country of Residence	N	Mean	SD	Interpretation
Border area	205	3.96	0.39	High
Suburb	141	3.93	0.34	High
City	103	4.08	0.44	High
Total	449	3.98	0.39	High

This is evidenced by the fact students' interview:
Yes, I can reproduce plants by grafting, and understand the tissue culture, but not yet tested, is still in the stage of understanding (Interview students: 2).

Like my friend too, I've tried tissue culture, but less successful (Interview students: 3)

Other interview found that students have the technology skills like as follows:

I've been learning about making out food fermentation of been, by way of deposition

reaction was given vinegar so that it can be deposited (Interview students: 3)
 Yes, I try to make food fermentation of been, is made from soybeans (Interview students: 4)

Results of student interviews are supported by faculty who assert:

This technology skills usually lead to the field of agriculture, how to grow the crops. The technologies skill that they get is still simple technologies (Interview with faculties: 4)

And then other faculty reconfirmed that the student is directed to have technology skills that they could be made:

Technology skills in particular areas of science, for high schools, the orientation is to continue the study up to college, however, we tried to keep the students have these skills, by adding the subjects of entrepreneurship, we classify it into self-development, we provide a variety of technology skills, for example in the field of chemistry, we provide post-harvest processing. If the field of IT, we provide the ability of making graphic design by using computers, and in the field of agriculture, we provide their skill by how to grafting and making cuttings of plants (Interview faculties: 3).

Based on the analysis of instruments and interview sessions, faculty and Sport Science Students in two-class of science group showed that they have technology skills in learning Science at high stage. It means that students as a whole have already understood in the run technology skills when study Science in their school both in the city, border area and suburb. Test of one-way ANOVA to examine the null hypothesis of H_0 . The result of the research showed that their significant difference of the stage of students' technology skills influenced by their location. By using one-way ANOVA test also showed there is a significant difference of students' technology skills based on their location like Table 2.

Student's technology skills based on their location showed significant difference $F(2, 446) = 4,498, p = 0.012$. Therefore, null hypothesis H_0 was rejected. This decision means that the technology skill of Sport Science Students in three location of students' residence is different. The multiple regression test of second null hypothesis $H_{0.2}$, to answer the third research question what's the contribution of science learning to student's technology skills. Table 4 showed that the decisions of Multiple Regression Analysis (Stepwise) were

administered to all respondents in high school in three location, border area, suburb, and in the city.

Table 2
Analysis of Differences in Students' Technology Skills Based on Their Location

Sources	DK	JDK	MDK	F	Sig. P
Inter Group	2	1.386	.693	4.498	0.012
In a Group	446	68.716	.154		
Total	448	70.102			

Significance level up to $p < 0.050$

DK = Degree of freedom

JDK = Coefficient Determinant

MDK = Main of Residual

The result of Bonferroni post hoc test showed that there were significant differences in students' technology skills based on their life in border area and in the city (mean of difference (IJ) = -1193, $p = 0.037$) and a significant difference of students who live in suburb and student who lived in the city (mean of Difference (IJ) = 0.1445, $p = 0.014$), like Table 3.

Table 3
Decision of Post hoc Bonferroni test on the Difference of Student Technology Skills Based on their Location

(I) Location	(J) Location	Difference of mean (I-J)	Corrected	Sig.
Border area	City	.0252	.04294	1.000
	Out of town	-.1193(*)	.04741	.037
Suburb	City	-.0252	.04294	1.000
	Out of town	-.1445(*)	.05088	.014
City	City	.1193(*)	.04741	.037
	Out of town	.1445(*)	.05088	.014

* Significance to the level of $p < 0.05$.

Regression analysis do step by step "stepwise" involving seven independent variables selected are learning science in the classroom, learning science in the laboratory, scientific literacy, gain support science learning materials, support and guidance of faculty, support from parents and peers and academic motivation. Only three of all variables concerning to the contribution or have significant effect ($p < 0.050$) to the number of variants of technology skills shown in Table 4.

According to Table 5, showed that from seven item of learning science activity in Sport Science Students mentioned above, there are three contributed significantly to influence students' technology skills by 27.7 percent. The highest variables contributed to the technology learning skills is learning science in the laboratory (20.4 percent), so the sequence variable is getting support from parents and peers (5.7 percent), and academic motivation (1.6 percent).

Table 4
Multiple Regression Analysis for Elements of Science Learning That Contribute to Technology Skills

Elements of Learning Science	B	Corrected	Beta	T	Sig	R	R ²	Contribution
Learning science in process in the laboratory	0.242	0.043	0.276	5.640	0.000	0.452	0.204	20.4
Support from parents and peers	0.158	0.042	0.189	3.755	0.000	0.512	0.261	5.7
Motivation	0.165	0.052	0.173	3.177	0.002	0.527	0.277	1.6
Constant	1.750	0.172						

Multiple regression = 0.527
 Coefficient Determinant = 0.277
 Corrected = 0.052

Table 5
Analysis of Variance

Source	Secondary Total	df	Secondary Mean	F	Sig.
Regression	19.440	3	6.480	56.918	0.000
Residual	50.662	445	0.114		
Total	70.102	448			

The decision of result showed the correlation between variables based on (APPS) and the whole set of independent variables is 0,277 (Multiple Regression). Levels of variance in the variables that significantly allied with all the independent variables can be explained by the power of the regression model that explains the value of R² is 27.7 percent. The main contribution of technological skills for Sport Science Students' technological skill is learning in the lab (Beta = 0276; t = 5.640; and sig. T = 0.000) and contributed as much as 20.7 percent. This situation can be shown if the learning scores of Sport Science Students increased by 0276 units.

When the two most important variables that contribute as much as 5.7 percent against the technology skills of Sport Science Students is to get support from parents and peers (Beta = 0189; t = 3755; and sig. T = 0.000). In other hand getting support from parents and peers helped students increased by one unit to increase Sport Science Students' technology skills as many as 0189 units to three location observed.

The Third contribution of variable to the student's technological skills is academic motivation to three location (Beta = 0.173; t = 3.177; and sig. P = 0.000). This result means that if academic motivation scores increased by one unit also increase Sport Science Students' technology skills as many as 0173 units in three location observed. Value of r = 0572 showed that the correlation between Sport Science Students technology skills variables and linear combination of three variables forecasters (learning process, parent and peer support and motivation). The value R² = 0277) showing the position of phase correlation and contribution or influence between the independent variables were selected on the technology skills of Sport Science Students to three location.

Through Table 4 (a) analysis of variance found that the value of F = 56 918 (DK = 3, 445) and significant at Sig (p = 0.000) < 0.001. As an explanation, the value of R² = 0277 percent refers to the overall contribution of three (3) variables observed were learning in the laboratory = 20.7 percent, getting support from parents and peers = 5.7 percent = and academic motivation = 1.6 percent. Generally, three independent variables from three location observed contribute significantly to the technological skills of Sport Science Students can be formed based on following regression equation:

$$Y = 1.75 + X_2 + 0.276X_1 + 0.819 + 0.712 + 0.713X_3$$

Notes:

- Y = Technology Skills
- X1 = Learning In the laboratory
- X2 = Support from parents and peers
- X3 = Academic Motivation
- Constant = 1,750
- Correction expert = 0.172

V. CONCLUSION

From the explanation of the research result showed that the Sport Science Students' technological skills are at a high stage in different location of Padang City. Students who lived in the city of Padang had higher technological skills than who lived in border and suburb. This occurs because the student lived in the city have more opportunities to perform their experiments, interviews with faculty. The support of parents, peers and academic motivation also contributes significantly to students' technology skills. Therefore, to generate and build the technology skills for Sport Science Students, faculty and parents need to provide opportunities and guidance for students to create experiments that can improve their technology skills. Recommendations for Sport Science faculty want to design and improve students' academic motivation in learning of science in order to concern suitable condition with student location

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