Relationship of Programming Skills and Perceived Value of Learning Programming among Information Technology Education Students in Davao Del Sur.

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***Abstract*: Computer programming can be a valuable tool for students to improve their thinking and problem-solving abilities. This study aims to analyze the relationship between programming skills and the perceived value of learning programming among Information Technology Students in Davao Del Sur. This study utilized two adapted questionnaires during the data collection using google form software; the survey was distributed in different schools around Davao Del Sur with 100 respondents. The researchers of this study showcase quantitative research utilizing a correlational research method to analyze the relationship between the two variables. A statistician interpreted and analyzed the collected data using four statistical tools: weighted mean, variance analysis, relative frequency, and Pearson's r. The interpreted data were explained and presented well by the researchers properly and more clearly.**

Furthermore, it shows the positive correlations between Programming Skills and Perceived Value of Learning Programming. In connection with that, there is a significant relationship between Programming Skills and Perceived Value of Learning Programming among Information Technology Education students. This positive correlation implies that when the Programming Skills increases, it can be assumed that Perceived Value of Learning Programming also increases.

***Keywords*: quantitative research, correlational research design, programming skills, perceived value of learning programming, Davao Del Sur.**

I. INTRODUCTION

1.1 Background of the Study

The learning method has been influenced by the enlargement and evolution of computer, and multimedia technologies. Nowadays, Information Technology or IT rapidly developing in many countries thanks to globalization and technological modification. Recently, IT widely used to employed in several areas or sectors like economy, politics, social and most of all, education. The emergence of IT improved each student's academic venture because it brings loads of benefits. Recent years have witnessed up to date business and jobs in demand throughout the United States, requiring Information Technology majors to possess competent programming skills [1]. Due to the importance of programming activities at geographic point for IT majors, IT departments need students to finish programming courses to perform effectively in their future careers. IT educators need to acknowledge the wants of IT students and supply effective support in their programming courses.

On the other hand, the programming skills depends upon the value of learning of the student whose course is related to the information system. Students with little or no previous exposure to programming, experience difficulties in learning how to proper code and createother hand, the, Perceived Value of Learning Programming, is anchored to the Theory of the expectancy-value developed by Wozney, Venkatesh and Abrami[3]. These theories show the possible interconnection of the variables in this present study.

The complexity of teaching programming has emerged in the literature and has been identified as one of the challenges in computer science education[4]. Connectedly, the theory of Biggs and Collis which is Structure of Observed Learning Outcomes is there to help student in mastery of code tracing indicated their readiness to reason about explaining the code, and solving problems related in coding. This theory assesses programming skill where skill is inferred from programming performance and tests of working memory and programming knowledge. Programming requires many distinct skills. In addition to basic programming knowledge, it also requires procedural skills to perform tasks. [5]

Further, the variable Perceived Value of Learning Programming is anchored to the expectancy-value theory developed by Wozney, Venkatesh and Abrami. According to this theory, person's perceived value and expectancy of success determine their intention to perform a job. In other words, students are likely to use Technology in learning if the perceived value and expectancy of success of the innovation are high and if these values are perceived to offer more than the perceived costs of innovative use of Information Communication Technology[3]. On the other side IT educators now can explore an additional delivery environment in programming to help to improve the level of motivation among future programmers.

1.2 Theoretical framework

The Programming Skills, is anchored to the theory of Structure of Observed Learning Outcomes proposed by Biggs and Collis[2]. On the other hand, the, Perceived Value of Learning Programming, is anchored to the expectancy-value theory developed by Wozney, Venkatesh and Abrami[3]. These theories show the possible interconnection of the variables in this present study.

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1.3 Conceptual Framework

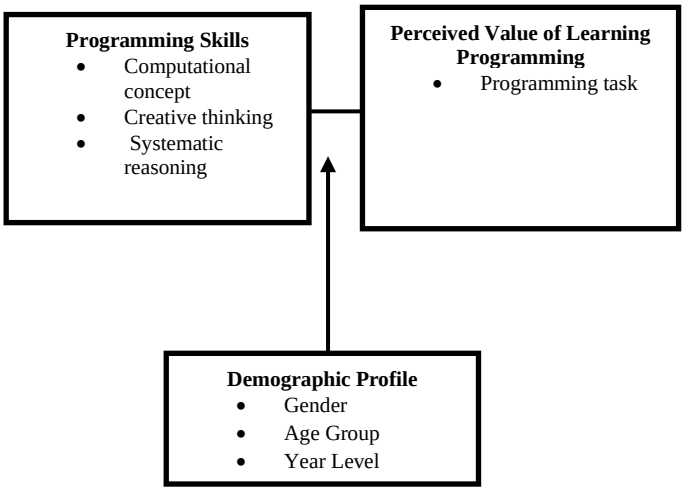

Figure 1. Conceptual Framework of the study

The conceptual framework above presents the important variables of the study and their respective indicators. It shows the possible interconnection of variables concerning the moderating variable.

According to the authors of this study, the environment offers possibilities for learning fundamental computational ideas and room for creative thinking, systematic reasoning, and collaborative work.[13]. Meanwhile the variable perceived value of learning programming needs to be expand in programming task.[14]

1.4 Research Questions

This study intends to find out the relationship of programming skills and perceived value of earning Programming among Information Technology Education Students in Davao del Sur. Specifically, this study seeks, to answer the following questions:

RQ1. What is the demographic profile of the participants of the study in terms of:

1.1 Gender
1.2 Age Group
1.3 Year Level

RQ2. What is the level of Programming Skill among Information Technology Education Students in term of:

2.1 Computational concept
2.2 Creative thinking
2.3 Systematic reasoning

RQ3. What is the level of Perceived Value of Learning Programming among Information Technology Education Students in terms of:

3.1 Programming Task

RQ4. Is there a significant difference in the level of Programming Skill among Information Technology Education Students in when grouped according to:

4.1 Gender
4.2 Age Group
4.3 Year

RQ5. Is there a significant difference in the level of Learning Programming among Information Technology Education Students in when grouped according to:

5.1 Gender
5.2 Age Group
5.3 Year Level

RQ6. Is there a significant relationship between programming skills and perceived value of learning programming among Information Technology Education student?

1.5 Null Hypothesis

Ho1: There is no significant programming skills among Information Technology Education Students. When grouped according to gender, age group, and year level,

Ho2: There is no significant difference in the level of and

Learning Programming among Information Technology Education Students. When grouped according to gender, age group, and year level.

Ho3: There is no significant relationship between the Programming Skills and Perceived Value of Learning Programming among Information Technology Education Students?

II. METHODOLOGY

2.1 Research Design

Every research has its own design to give pattern to the project. In this quantitative study, researchers would use the correlational research design. According to Simon [15] correlational technique is a non-experimental design, where researchers display the relationships among variables. It is used to describe the variables when the research was conducted after the phenomenon of interest has occurred naturally. The main purpose of a correlational study is to determine relationships between variables and a regression equation that could be used to make predictions to the population. The level of relationship determines how closely the variables are related..

2.2 Research Locale

This research study will be conducted in the Province of Davao del sur Philippines which located in the Davao Region between *Davao* City to the north, *Davao* Occidental to the south-east, North Cotabato to the west. The respondents are selected IT students.

2.3 Participants of the Study

The participants of this study will be the Information Technology Students in Davao del Sur. This study refers to all members of a particular group. The researchers selected 100 students among Information Technology Students in Davao del Sur.

2.4 Sampling Techniques

The researchers used the quota sampling technique. Non-probability sampling, such as quota sampling, is a form of non-probability sampling method. This indicates that elements of the population are picked in a non-random manner, and that, not everyone in the population has an equal chance of being chosen to be a member of the sample group[16]. Since, The schools of Davao Del Sur offers BSIT program, so the researcher used this sampling technique. The researchers decided to choose 100 respondents, which are Information Technology Students in Davao del Sur**.**

2.5 Statistical Treatments

The following are the statistical tools to be used upon the conduct of this research study:

1. Relative Frequency. This tool will be used to describe the Gender, Age Group, Year Level a of the respondents as provided in sub problem 1.
2. Weighted Mean. This tool will be used to describe the levels of Programming Skills and f Learning Programming among Information Technology Education Students as provided in sub problems 2 and 3.
3. Analysis of Variance. This tool will be used to describe the significant differences of the
4. levels of the Programming Skills and the Learning Programming when analyzed by Gender, Age Group, and year level as provided in the sub questions 4 and 5.
5. Pearson r. This tool will be used to describe the significant relationship between the Programming Skills and Learning Programming among Information Technology Education Students in Davao Del Sur.as provided in sub problem 6.

2.6 Data Collection Procedure

Data Collection Procedure To effectively gather the needed data, the researcher used a google form to conduct a survey to all Information Technology Education Students. We can't conduct a face-to-face survey questionnaire because we are now facing a pandemic and we follow the protocol. But before we proceed to give a questionnaire, we ask for approval to select the respondents through social media platforms like Facebook and Messenger.

The online survey is a structured questionnaire like any other research questionnaire that your needed respondents complete by filling out a form through online platforms [17]. Google form is an internet-based platform that is used to gather data.

2.7 Research Instrument

This research was adopted from two research studies that are related to this topic. The first study adopted in this research is The Development of Programming Expertise in Adults and Children by D. Midian Kurland, Ronald Mawby, and Nancy Cahir Center for Children and Technology Bank Street College of Education. The study was conducted in two parts, a group of adult programmers is the first group who occur in a series of depth interviews, and the group of programming "whiz kids" under the age of 15 who also occur in an interview and a test. The researchers include twenty adults in the first part of their study, Seven were graduate students who were doctoral candidates in computer science (between the ages of 20 and 30), five were professional software game designers (between the ages of 20 and 30), and eight were commercial programmers who served as system analyst (between the ages of 20 and 40). The twenty participants were asked and answered the 65-item questionnaire. For the second part of the study, the researchers look for students under the age of 14 in the New York City area for the study phase. Children who have spent thousands of hours playing sophisticated computer games and who knew some programming language or are deeply involved with programming. The researchers test the children to write a

program that requires the ability to develop an algorithm plus the ability to use conditionals and stop rules [6].

The second study is Towards Enhancing Programming Self-efficacy Perceptions Among Undergraduate Information Systems Students by Ramadan Abdunabi, Ilham Hbaci, and Heng-Yu Ku. This study was conducted at Colorado State University in the U.S.A. to foresee students' perception of learning programming with its values and difficulties that can affect their skills and acquisitions. This study used 32 items to measure students' java programming self-efficacy from Askar and Davenport's (2009) Java Programming Self-Efficacy scale, where students' perceived self-efficacy was rated with various tasks in java programming on a Likert-type scale. They slightly modified the Likert-type scale from 7 - a point to a 5 -point scale [1].

2.8 Ethical Considerations

In this research ethical considerations is essential in transmitting a questionnaire, it should be done in a pleasant way with integrity. To not contravene the health protocols, the researchers will disseminate questionnaires via Google forms to uphold the health protocols. Clarity of instructions and information are distinctly elaborated in the questionnaire. All the respondents' responses will be kept and stay confidential. The response will be acknowledged and respects whatever decision the respondents want. The cooperation, volunteerism, and honesty of the respondents of this study were highly appreciated.

III. RESULT AND DISCUSSION

RQ1. What is the demographic profile of the participants of the study in terms of:

1.1 Gender
1.2 Age Group
1.3 Year Level

The table 1 shows the demographic profile of the respondents in terms of gender, age group, and year level. As shown, there are 100 students who have responded in the survey.

Table 1. Profile of the Students

Characteristics (n=100)	Level	Frequency	%
Gender	Male	58	58.0
	Female	37	37.0
	Prefer not to say	3	3.0
	Others	2	2.0
Age Group	18-25 years old	91	91.0
	26-30years old	9	9.0
Year Level	1st year	31	31
	2nd year	17	17.0
	3rd year	29	29.0
	4th year	23	23.0

The table shows that there are 100 students who have responded to the survey. In terms of gender, 58 of the respondents are males,37 are females, 3 prefer not to say and 2 others. In terms of the Age Group, 91 of the respondents are 18 to 25 years old and 9 are 26 to 30 years old. In terms of year level, 31 are first, 17 in second, 29 in third, and 23 in fourth-year students.

Continually, the second research question asks for the level of Programming Skill among college students in Davao del Sur. in terms of level of usage of Programming Skill. Table 2 provides the answer for the question.

RQ2. What is the level of Programming Skill among Information Technology Education Students in term of:

2.1 Computational concept
2.2 Creative thinking
2.3 Systematic reasoning

Table 2. Level of Programming Skill

Indicators	$\bar{x}$	SD	Description
Computational concept	2.7	.987	Moderate
Creative Thinking	.50	1.087	High
Systematic Reasoning	2.75	.987	Moderate
Total	**2.66**	**.949**	**High**

The level of Programming Skill among Information Technology Education Students in Davao del Sur is 2.66 with a standard deviation of .949. This means that Programming Skill among Information Technology Education Students is **Manifested.**

RQ3. What is the level of Perceived Value of Learning Programming among Information Technology Education Students in terms of:

3.1 Programming Task

In the table 3 are the respective means and standard deviations of each indicator under the variable Level of Perceived Value of Learning Programming.

Table 3. Level of Perceived Value of Learning Programming

Indicators	$\bar{x}$	SD	Description
Programming Task	2.80	.931	Moderate

The level of Perceived Value of Learning Programming among Information Technology Education students is 2.80 with a standard deviation of .931. This means that Programming Skill among Information Technology Education students is Somewhat manifested.

RQ4. Is there a significant difference in the level of Programming Skill among Information Technology Education Students in when grouped according to:

4.1 Gender
4.2 Age Group

4.3 Year Level

Table 4. Significant Difference on the level of Programming Skill among Information Technology Education Students in when grouped according to Gender, Age Group, and Year Level

Test Variables	F	Sig.	Decision
Gender	2.248	.002	Reject Ho
Age Group	.826	.747	Accept Ho
Year Level	1.194	.809	Accept Ho

Since p-values for Age Group and Year Level, are .747 and .809 > 0.05, respectively, then we do not reject the null hypothesis. There is no significant difference on the level of Programming Skill among Information Technology Education Students when grouped according to Age Group and Year Level. However, when disaggregated according to Gender, p=value is .002, which rejects the Ho. This implies a significant difference in the level of Programming Skill between male and female Information Technology Education students.

RQ5. Is there a significant difference in the level of Learning Programming among Information Technology Education Students in when grouped according to:

5.1 Gender
5.2 Age Group
5.3 Year Level

Table 5. Significant Difference on the level of Perceived Value of Learning Programming among Information Technology Education Students in when grouped according to Gender, Age Group, and Year Level

Test Variables	F	Sig.	Decision
Gender	.983	.514	Accept Ho
Age Group	.516	.984	Accept Ho
Year Level	1.182	.276	Accept Ho

Since p-values for Gender, Age Group and Year Level, are .514, .984 and .276 > 0.05, respectively, then we do not reject the null hypothesis. There is no significant difference on the Perceived Value of Learning Programming level among Information Technology Education Students when grouped according to Gender, Age Group and Year Level.

RQ6. Is there a significant relationship between programming skills and perceived value of learning programming among Information Technology Education student?

Table 6. Correlations Relationship Between Programming Skills and Perceived Value of Learning Programming

Variables	R-value	P-value	Decision
Programming Skill (Computational Concept) x Perceived Value of Learning Programming	.741	.000**	Reject Ho
Programming Skill (Creative Thinking) x Perceived Value of Learning Programming	.756	.000**	Reject Ho
Programming Skill (Systematic Reasoning) x Perceived Value of Learning Programming	.760	.000**	Reject Ho
Programming Skills x Perceived Value of Learning Programming	.809	.000**	Reject Ho

Table 6 shows the positive correlations between Programming Skills and Perceived Value of Learning Programming. Since p-values are all .000 and <0.01, then we reject the null hypothesis. There is a significant relationship between Programming Skills and Perceived Value of Learning Programming among Information Technology Education students. This positive correlation implies that when the Programming Skills increases, it can be assumed that Perceived Value of Learning Programming also increases.

On the strength of relationship between the indicators Programming Skills (Computational Concept, Creative Thinking and Systematic Reasoning) and Perceived Value of Learning Programming, r=values .741, .756, and .760, respectively indicate Strong Positive Relationship.

Overall, on the strength of relationship between Programming Skills and Perceived Value of Learning Programming has an r=.809, which implies that it has Strong Positive Relationship.[18]From this information, it is assumed that programming skills also significantly affect other themes. The results of the studies done in the effects of Programming Skills and Perceived Value of Learning programming on self-efficacies match up with the results of this study. Overall, the students participated in Programming Skills and Perceived Value of Learning, raising their self-efficacy perceptions.

IV. CONCLUSIONS

The demographic profile contains the gender, age group and year level. The data shows that among 100 who responded to the survey, most of the respondents were males. The respondents were ranging from 1st year to 4th year students of information technology program in Davao Del Sur.

The level of Perceived Value of Learning Programming among Information Technology Education students is 2.80 with a standard deviation of .931. This means that Programming Skill among Information Technology Education students is Somewhat manifested.

However, The level of Programming Skill among Information Technology Education students is 2.66 with a standard deviation of .949. This means that Programming Skill among Information Technology Education students is manifested.

The level of Programming Skill among Information Technology Education Students in when grouped according to Gender, Age Group, and Year Level implies that

There is no significant difference on the level of Programming Skill among Information Technology Education Students when grouped according to Age Group and Year Level. Furthermore, the positive correlations between

Programming Skills and Perceived Value of Learning Programming that there is a significant relationship between Programming Skills and Perceived Value of Learning Programming among Information Technology Education students.

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