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INVESTIGATING LEVEL OF PERCEIVED ATTRIBUTES AND SOCIAL INFLUENCE FOR USING SYSTEM DEVELOPMENT METHODOLOGY AMONG STUDENTS

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ABSTRACT

The main objective of this study is to assess student's perceived attribute and social influence for using system development methodology. There were four different levels being assessed by using an adapted instrument. The levels are (i) compatibility, (ii) complexity, (iii) relative advantage and (iv) social influence. The questionnaires were distributed to 274 undergraduate degree students from a local university in Malaysia. The data was assessed by using Kruskal-Wallis. The results show that there are significant differences in term of (i) compatibility, (ii) relative advantage and (iii) social influence among different program areas. Thus, provide indication for the need of customization and better understanding for different programs from different niche area to improve the perceived attributes and social influence for using system and web systems development methodology.

Keywords: system development methodology.

INTRODUCTION

Information system project has much higher failure rate compared with other technology projects [1]. In Malaysia, the descriptions of information system failure include abandoned projects, over schedule, over budget, not fulfil user requirement and project objective not achieved [2]. A system development methodology is a step by step that assists the development of better quality information system and may prevent low rate of project failure.

As many people believe using system development methodology can increases success rate of information system project, there are still some companies do not preferred to use system development methodology [3]. The main objective of this empirical study is to assess student's perceived attribute and social influence toward system development methodology among students from local university in Malaysia.

RESEARCH METHOD

The instrument used in this study was adapted from Bonner (2008) [4]. There were four different levels being assessed. The levels are (i) compatibility, (ii) complexity, (iii) relative advantage and (iv) social influence among students in using the systems development methodology. The sample consists of 274 undergraduate degree students which were being distributed to a local university in Malaysia.

RESULT AND ANALYSIS

Demographic profile

Table-1. Descriptive Statistics (Students profile).

Measure	Items	Frequencies	Percentage
Gender	Male	87	31.8
	Female	187	68.2
Program Areas	Information Technology	43	15.7
	Intelligent System	51	18.6
	Computer Science	104	38.0
	Information System Engineering	76	27.7
Part	3 and less	13	4.7
	4	92	33.6
	5	61	22.3
	6 and more	108	39.4

Table-1 shows the descriptive statistics of the respondents. Table-2 shows the total number of information system being developed by students. There was about 21.9% of the students had the experience of developing between one to two information systems. Furthermore, the percentage of student with experience of developing between three to four information systems are about 24.8%. The percentage of students that had experience of developing between five to six information systems was about 25.2%. The percentage of students that had the experience of developing seven to eight information systems was about 8.4%. The percentage of students that had developed more than eight information systems was about 19.7%.

Table-2. Number of system student had experience in development.

Item	Frequency	Percentage
1-2	60	21.9
3-4	68	24.8
5-6	69	25.2
7-8	23	8.4
>8	54	19.7
Total	274	100.0

Table-3. System development methodology model used by students.

Model	Frequency/ 274	Percentage
Waterfall	201	73.4
V-Model	34	12.4
SDLC	232	84.7
SSADM	19	6.9
OOAD	63	23.0
CMM	12	4.4
CMMI	18	6.6
IEM	1	0.4
SSM	9	3.3
JSD	1	0.4
WSM	1	0.4
RAD	38	13.9
MERISE	0	0
STRADIS	2	0.7
Others	4	1.5

Table-3 shows the students experience in using system development methodology. The most system methodology choose by student was SDLC, with the percentage of 84.7% from the total respondents. It was then followed by another traditional methodology which is waterfall with 73.4% from the total respondents. The OOAD showed 23.0% from the total respondents.

Complexity of system development methodology

To test the normality of Complexity of System Development Methodology, a set of hypotheses is formulated. The list of the hypotheses is presented as follow:

Ho: The sample comes from normal distribution.
Ha: The sample does not come from normal distribution.

The Kolmogorov-Smirnov's test showed the p-value as 0.000, which was less than 0.05 (as showed in Table-4). Thus, the distribution is not normal. Thus we reject Ho. This sample is not normal.

Table-4. Test of Normality (Complexity of system development methodology).

	Kolmogorov-Smirnov(a)		
	Statistic	df	Sig.
Ttl_cmplx	.120	274	.000

a Lilliefors Significance Correction

Since the data are not normal, Kruskal-Wallis test was used in the analysis. The mean of different the program areas and parts were being compared. The following research questions (RQ) have been developed; RQ1 and RQ2.

RQ1: Is there enough evidence that on the average total score Complexity of System Development Methodology is different for program areas *(Information Technology, Intelligent System, Computer Science and Information System Engineering)?*

As showed in Table-5, the sig-value was 0.738. This is more than alpha level 0.05, so we cannot conclude that there is statistically significant different in the score Complexity of System Development Methodology score across four programs.

Table-5. Test Statistics (a,b) (Complexity of system development methodology).

	Complexity
Chi-Square	1.262
df	3
Asymp. Sig.	.738

a Kruskal Wallis Test
b Grouping Variable: Programs

RQ2: Is there enough evidence that on the average total score Complexity of System Development Methodology is different for parts *(3 & below, 4, 5, 6 & above)*?

As showed in Table-6, the sig-value was 0.739. This is more than alpha level 0.05, so we cannot conclude that there is statistically significant different in the score Complexity of System Development Methodology score across parts.

Table-6. Test Statistics (a, b) (Complexity of system development methodology).

	Complexity
Chi-Square	1.259
df	3
Asymp. Sig.	.739

a Kruskal Wallis Test
b Grouping Variable: Parts

Compatibility of System Development Methodology

To test the normality of Compatibility of System Development Methodology, a set of hypotheses is formulated. The list of the hypotheses is presented as follow:

Ho: The sample comes from normal distribution
Ha: The sample does not come from normal distribution

The Kolmogorov-Smirnov's test showed the p-value as 0.000, which was less than 0.05 (as showed in Table-7). Thus, the distribution is not normal. Thus we reject Ho. This sample is not normal.

Table-7. Test of Normality (Compatibility of system development methodology).

	Kolmogorov-Smirnov(a)		
	Statistic	df	Sig.
Compatibility	.117	274	.000

a Lilliefors Significance Correction

Since the data are not normal, Kruskal-Wallis test was used in the analysis. The mean of different programs and parts were being compared.

The following research questions (RQ) have been developed; RQ3 and RQ4.

RQ3: Is there enough evidence that on the average total score Compatibility of System Development Methodology is different for program areas *(Information Technology, Intelligent System, Computer Science and Information System Engineering)?*

As showed in Table-8, the sig-value was 0.003. This is less than alpha level 0.05, so we can conclude that there is statistically significant different in the score Compatibility of System Development Methodology score across four program areass. An inspection of the mean ranks suggests program area "Information System Engineering" had the highest compatibility on the usage of System Development Methodology among programs (as showed in Table-9). Table-9 showed that the program area had highest mean rank with 159.41.

Table-8. Test Statistics (a, b) (Compatibility of system development methodology).

	Compatibility
Chi-Square	14.186
df	3
Asymp. Sig.	.003

a Kruskal Wallis Test
b Grouping Variable: Programs

Table-9. Mean Rank of Four Programs (Compatibility of system development methodology).

	Program areas	N	Mean rank
Compatibility	Information Technology	43	126.84
	Intelligent System	51	151.53
	Information Systems Engineering	76	159.41
	Computer Science	104	119.01
	Total	274	

RQ4: Is there enough evidence that on the average total score Compatibility of System Development Methodology is different for parts (3 & below, 4, 5, 6 & above)?

As showed in Table-10, the sig-value was 0.626. This is more than alpha level 0.05, so we cannot conclude that there is statistically significant different in the Compatibility of System Development Methodology score across parts.

Table-10. Test Statistics (a, b) (Compatibility of system development methodology).

	Compatibility
Chi-Square	1.751
df	3
Asymp. Sig.	.626

a Kruskal Wallis Test
b Grouping Variable: Parts

Relative advantage of system development methodology

To test the normality of Relative Advantage of System Development Methodology, a set of hypotheses is formulated. The list of the hypotheses is presented as follow:

Ho: The sample comes from normal distribution
Ha: The sample does not come from normal distribution

The Kolmogorov-Smirnov's test showed the p-value as 0.000, which is less than 0.05 (as been showed in Table-11). Thus, the distribution is not normal. Thus we reject Ho. This sample is not normal.

Table-11. Test of normality (Relative advantage of system development methodology).

	Kolmogorov-Smirnov(a)		
	Statistic	df	Sig.
Advantage	.115	274	.000

a Lilliefors Significance Correction

Since the data are not normal, Kruskal-Wallis test was used. The mean of different program areas and by parts were being compared. The following research questions (RQ) have been developed; RQ5 and RQ6.

RQ5: Is there enough evidence that on the average total score Relative Advantage of System Development Methodology is different for program areas *(Information Technology, Intelligent System, Computer Science and Information System Engineering)*?

As showed in Table-12, the sig-value was 0.001. This is less than alpha level 0.05, thus we conclude that there is statistically significant different in the Relative Advantage of System Development Methodology score across four program areas. An inspection of the mean ranks suggests program area of "Information Systems Engineering" had the highest Relative Advantage on the usage of System Development Methodology among other programs area. As showed in Table-13, the program area "Information Systems Engineering" had the highest mean rank than other programs with 167.47.

Table-12. Test Statistics (a, b) (Relative advantage of system development methodology).

	Relative advantage
Chi-Square	16.518
df	3
Asymp. Sig.	.001

a Kruskal Wallis Test
b Grouping Variable: Programs

Table-13. Mean rank of four programs (Relative Advantage of system development methodology).

	Program areas	N	Mean rank
Advantage	Information Technology	43	134.56
	Intelligent System	51	130.25
	Information Systems Engineering	76	167.47
	Computer Science	104	120.37
	Total	274	

Table-14. Test Statistics (a, b) (Relative advantage of system development methodology).

	Relative advantage
Chi-Square	2.928
df	3
Asymp. Sig.	.403

a Kruskal Wallis Test
b Grouping Variable: Parts

RQ6: Is there enough evidence that on the average total score Relative Advantage of System Development Methodology is different for parts *(3 & below, 4, 5, 6 & above)*?

As showed in Table-14, the sig-value was 0.403. This is more than alpha level 0.05, so we cannot conclude that there is statistically significant different in the Relative Advantage of System Development Methodology score across four groups.

Social influence of system development methodology

To test the normality of Social Influence of System Development Methodology, a set of hypotheses is formulated. The list of the hypotheses is presented as follow:

Ho: The sample comes from normal distribution
Ha: The sample does not come from normal distribution

The Kolmogorov-Smirnov's test showed the p-value as 0.000, which is less than 0.05 (as been showed in Table-15). The distribution is not normal. Thus we reject Ho.

Table-15. Test of normality (Social influence of system development methodology).

	Kolmogorov-Smirnov(a)		
	Statistic	df	Sig.
Social Influence	.159	274	.000

a Lilliefors Significance Correction

Since the data are not normal, Kruskal-Wallis test was being used. The mean of different programs and parts were being compared. The two research questions (RQ) that had been developed; RQ7 and RQ8.

RQ7: Is there enough evidence that on the average total score Social Influence of System Development Methodology is different for programs *(Information Technology, Intelligent System, Computer Science and Information System Engineering)*?

As showed in Table-16, the sig-value was 0.008. This is less than alpha level 0.05, thus there is statistically significant different in the Social Influence of System Development Methodology score across four groups. An inspection of the mean ranks suggests program area of "Information Systems Engineering" had the highest Social Influence on the usage of System Development Methodology (as showed in Table-17). In Table-17, program area "Information Systems Engineering" had the highest mean rank than other programs with 160.22.

Table-16. Test Statistics (a,b) (Social influence of system development methodology).

	Social influence
Chi-Square	11.845
df	3
Asymp. Sig.	.008

a Kruskal Wallis Test
b Grouping Variable: Programs

Table-17. Mean rank of four programs social influence of system development methodology.

	Program areas	N	Mean rank
Social Influence	Information Technology	43	142.42
	Intelligent System	51	134.17
	Information Systems Engineering	76	160.22
	Computer Science	104	120.50
	Total	274	

RQ8: Is there enough evidence that on the average total score Social Influence of System Development Methodology is different for parts *(3 & below, 4, 5, 6 & above)*?

As showed in Table-18, the sig-value was 0.366. This is more than alpha level 0.05, thus we cannot conclude that there is statistically significant different in the Social Influence of System Development Methodology score across four groups.

Table-18. Test Statistics (a,b) (Social influence of system development methodology).

	Social influence
Chi-Square	3.174
df	3
Asymp. Sig.	.366

a Kruskal Wallis Test
b Grouping Variable: Parts

CONCLUSIONS

The main objective of this study is to assess student's perceived attribute and social influence for using system development methodology. There were four different levels being assessed by using an adapted instrument. The levels are (i) compatibility, (ii) complexity, (iii) relative advantage and (iv) social influence. The questionnaires were distributed to 274 undergraduate degree students from a local university in Malaysia. The data was assessed by using Kruskal-Wallis. The results show that there are significant differences between different in term of (i) compatibility, (ii) relative advantage and (iii) social influence among different program areas.

There are two types of group that had been identified to represent result of level perceived attributes and social influence. The groups are by programs areas and by parts (semester). The program area "Information Systems Engineering" obtains highest mean rank of compatibility, relative advantage and social influence.

The results also showed that most student prefer to use traditional and less complex methodology in their project and assignments. The SDLC was the most chosen methodology with 232 or 84.7% of students had experience of using it. While Waterfall recorded with 201 or 73.4% from the total number of students. The complex methodology (OOAD) showed the percentage of 23.0% from the total number of students. There are large gap between the usage of traditional and complex methodology. Thus, it is recommended that student assessment project and assignment make use of complex methodology rather than traditional as to encourage more students experience in more complex methodology. The results of this research may be used to revise programs related to computing sciences discipline for better understanding and usage of systems and web systems development methodology.

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