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Use of Digital Storytelling as a Teaching Tool at National University of Science and Technology

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Abstract

Digital Storytelling is a very popular teaching and learning technique used worldwide today. This teaching methodology has equally been used at universities and schools throughout different regions and cultures for the common aim to enhance the learning experience of students. Hence various studies have been conducted to estimate the extent of usage and effectiveness of this technique by both faculty members and students. The previously conducted studies are characterized over varying response variables, sample size, sample characteristics etc but all these studies converged the common results of enhanced learning experience among the students. Additionally the studies also exhibited the educational and instructive knowledge and the openness towards the adoption of new teaching methods by the faculty members. Our study conducted at National University of Science and Technology, based over a sample size of 100 respondents divided equally among students and faculty, investigates the use of DST tools by the faculty and its effectiveness on student learning shows a positive relationship between the departments of faculty and students' learning.

Key words: Digital Story Telling, Chi-Square Test.

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Introduction

Story telling is one of the best strategy of teaching because it serves many purposes at one time in single classroom siting e.g. motivating interest of learning, controlling students behavioral problems overcoming students, resistance and anxiety and building strong relationship between students and teachers (Melanie, 2004) with advancement of technology specially linkage of ICT with effective teaching and learning this strategy has become more effective interms of functionality teachers can utilize this technique with ICT tools more effectively in their teaching.

Digital story telling is the new way of telling stories digitally via music, other auditory cues, images, situations, experiences (Leslie Rule, Digital story telling association, 2011). 'A digital story consists of a series of still images combined with a narrated sound track to tell a story' (Bull & Kajder, 2004). Digital story telling are personalized multimedia bits which people can make for themselves, like desktop computers now attached with video editors to synchronize sounds with images (Daniel Meadows, Cardiff University, 2008). Gere (2002) defines storytelling as "the act of using language and gesture in colorful ways to create scenes in a sequence" (p. 2).

Literature Review

The best way to achieve modern time objectives for educational advancement is via amalgamation of technology with learning and social constructivism principles (Yang & Wu, 2011). Knowledge is not simply passed from instructor to student but is constructed through the interaction of physical, social and technological environment (Fosnot, 1996, Prawat, 1996).

Technology has taken different shapes, it has made our life so different, that we are now just one click away from all the knowledge, books are getting extinct now, even faculty are also relying more on digital story telling rather than old mechanism of teaching. This paper shows what various authors have said about digital storytelling, who have adopted it and how they view it compared to traditional methods. 'Among technological advancements influencing education, the availability of advanced low- cost, and user- friendly digital cameras and multimedia editing software (e.g., iMovie, Movie Maker, and Photo Story) offers great potential for innovative teaching and learning' (Yang & Wu, 2011).

‘Students with an external thinking style tend to be more extroverted and prefer to learn collaboratively, whereas students with internal thinking style are usually introverted and prefer to learn alone’ (Betoret, 2007; Sternberg, 1999).

Wilcox (2007) wrote a paper on the same subject on digital storytelling and the purpose of the paper was that how people of California perceive digital storytelling and the result was pretty positive, many variables were just like social constructivism, leadership, empowerment, and participation to conduct this study (Berk, 2010). In modern times higher education students require a medium or networking opportunities across their institution so today university are not just aiming on teaching basic things but on research collaboration as well (Mitchell & Watstein, 2007). Even Higher Education Commission of Pakistan has granted digital library to the students of Pakistan to increase their knowledge scope.

With the help of DST students have also learnt this technique of storytelling and the art of making an impact on the viewers or readers. (Jonassen, Howland, & Marra, 2008) Students are able to gather all the elements of writing a story and putting/comprehending it effectively. Stories are used as a tool or a source of significance and clarification stored up in our memories (DeNatale, 2008). DST is mostly used as a strategy for memorizing or effective learning from their courses.

Digital videos can also be used as an important source of learning, inquiring and observing different aspects of a certain situation for students. For example videos can direct and support students in classrooms through the process of their learning in an environment built by the teachers by using video sources and finding out different results of a particular theory/assumption. (Smith & Reiser, 2005)

The use of digital storytelling also reflects the educational or instructive knowledge of the teachers as well. (Krauskopf, Zahn, & Hesse, 2011) DST is also used as a source of entertainment and a motivation for students given by the teachers to sit through the class. (Hobbs, 2006)

Despite the absence of electricity, scarce resources and limitation of number of laptops, Jumping Frog School has built a special room dedicated for a computer lab and digital storytelling and has made it an anticipated component of the school curriculum. The digital storytelling intervention is allowing students and teachers to articulate and document important issues for the community. Researchers have shared hope for technology empowerment of the rural regions of Bhutan with mutual respect for shared goals for the pursuit of happiness. (Gyabak & Godina, 2011)

Silku (2009) show positive attitudes of faculty of communication towards computer usage which are unaffected by any of these variables - departments, years, ages, sexes, high schools, family incomes, education levels of their parents, computer usage, whether having computers at home, or acquiring computer education before or after their college years.

Learning and digital story telling are totally twined together as these two things help students in the process of learning a subject, examining a certain object or even experience of a particular person. The tools used in DST also facilitate students in order to participate actively in the classroom and due to this teachers can also properly assess their students' performance. Teachers have also started DST for keeping in track the progress of their students. DST is also used by teachers as a source of cross cultural learning so that students can relate the things that they have learned in class with those happening worldwide. This new means of learning is not only used by teachers of arts, humanities and social sciences but also by the professors of pure sciences as well for example medical students can observe surgeries etc. in class before practically going in the field. (DeNatale, 2008)

Story telling is not only used as a tool for learning but it is also used for motivating and fully engaging the students in their respective courses. (Mello, 2001) DST is a technique of communicating ideas and experiences in order to add value to the learning of the students. This tool not only assists professors in teaching their courses but it also helps them in communicating values and behaviors of different cultures and societies so that their students can effectively compete in the world**.**

Objectives of the Study

To estimate the proportion of faculty members, in National University of Science and Technology (NUST), using the tools of Digital Story Telling.

To estimate the proportion of faculty members using the tools of digital storytelling and its relative effect on the learning and performance of students, at National University of Science and Technology (NUST).

Methodology

This study was conducted in National University of Science and Technology H-12 Islamabad, we collected data of 100 which was divided into 50 students and 50 faculty. We matched the result of both teachers and students on how many teacher uses digital storytelling and what benefits did it bring environment in the educational system.

We have chosen both stratified random sampling and equal random sampling. First we dividend our sample size into 50 students and 50 faculty than from those 50, we broke this sample size into ratios according to the total population. We divided on basis of schools after checking strength of each. For the faculty members, we had 11 from NUST Business School, 5 from Centre for Advanced Mathematics and Physics, 11 from School of Electrical Engineering and Computer Sciences, 6 from School of Art, Design, and Architecture, 7 from Atta-ur-Rahman School of Applied Biosciences, 5 from School of Chemical and Materials Engineering, 5 from Institute of Environmental Sciences and Engineering. We divided the student as at, 12 from NUST Business School, 5 from Centre for Advanced Mathematics and Physics, 9 from School of Electrical Engineering and Computer Sciences, 5 from School of Art, Design, and Architecture, 12 from Atta-ur-Rahman School of Applied Biosciences, 4 from School of Chemical and Materials Engineering, 3 from Institute of Environmental Sciences and Engineering.

Our study is based on the notion that it is important to determine the digital story telling usage in National University of Science and Technology to actually get an idea that what affects digital story telling usage, we identified some relevant variables and have assessed their relationships with our survey questions variables index.

The key relationships that we observed in our study response taken from students are listed below:

- NUST Schools, Department, Previous schooling, Gender, Age, Semester, Techniques variables with variable enthusiasm.
- NUST Schools, Department, Previous schooling, Gender, Age, Semester, Techniques variables with variable emotional response.
- NUST Schools, Department, Previous schooling, Gender, Age, Semester, Techniques variables with variable faculty response.
- NUST Schools, Department, Previous schooling, Gender, Age, Semester, Techniques variables with variable learning.

The key relationships that we observed in our study response from faculty are listed below:

- NUST Schools, Department, Gender, Age, Qualification of faculty, work experience, Total teaching experience, Techniques used variables with enthusiasm.
- NUST Schools, Department, Gender, Age, Qualification of faculty, work experience, Total teaching experience, Techniques used variables with emotional response.

- NUST Schools, Department, Gender, Age, Qualification of faculty, work experience, Total teaching experience, Techniques used variables with faculty response.
- NUST Schools, Department, Gender, Age, Qualification of faculty, work experience, Total teaching experience, Techniques used variables with learning.

Usage of Digital story telling is observed both qualitatively and quantitatively, age, work experience and total work experience are those quantitative variables. For others we recoded into numbers, high, medium low depending on the variable. We have used ordinal scale for our survey plus for our response questions we have used category and Likert rating scale. Results lying from strongly agree, agree, maybe, disagree and strongly disagree.

An enthusiasm variable was checked by factors interest, motivation, concentration, and participation level with usage of digital story telling. An emotional response variable was checked by factors attraction, focused, collaborative learning and role play in studies with usage of digital story telling. Faculty response variable was checked by factors attitude towards digital storytelling, and comfortably shifted to this new system with usage of digital story telling. Learning response variable was checked by explaining concept well, performance level in students, and achievement level in studies with usage of digital story telling.

The results have been recorded in SPSS and cross tab analysis has been used to find out which variables are actually affecting digital story telling usage. We have made 28 hypotheses for students response check and to match the results between students and faculty we have 32 hypotheses from faculty side.

In general the hypotheses are as following:

H_o*: The two variables are not related*
H_1*: The two variable are related*

Variable 1 are our general variables, NUST Schools, Department, Previous schooling, Gender, Age, Semester, Techniques, Qualification of faculty, Work experience at current organization and total teaching experience.

Variable 2 are the most important variable to evaluate the usage of digital storytelling, enthusiasm, emotional response, faculty response and learning index.

Results

Raw data is presented in Annexure.

H_o: Variable X1 and X2 are not related
H_1: Variable X1 and X2 are related

Decision criteria: Reject H_o if alpha is greater than or equal to *p*-value.

According to the results of our cross-tabs analysis the following null hypotheses have been rejected/accepted based on the above criteria. A tick represents a relationship and X represents no relationship.

For students

	Variable X2			
Variable X1	Enthusiasm	Emotional Response	Faculty Response	Learning
NUST Schools	✗	✓	✗	✓
Department	✗	✗	✗	✓
Previous schooling	✗	✗	✗	✗
Gender	✗	✗	✗	✗
Age	✗	✗	✗	✗
Semester	✗	✗	✗	✗
Techniques used	✗	✗	✗	✗

For Faculty

	Variable X2			
Variable X1	Enthusiasm	Emotional Response	Faculty Response	Learning
NUST Schools	✗	✓	✗	✗
Department	✓	✗	✗	✓
Gender	✗	✗	✗	✗
Age	✓	✗	✗	✗
Qualification	✗	✗	✗	✗
Work experience	✗	✗	✗	✗
Total Teaching experience	✓	✗	✗	✗
Techniques used	✗	✗	✗	✓

The results of the hypothesis rejected above are discusses below.

1. H_o: NUST Schools and emotional response are not related
   H_1: NUST Schools and emotional response are related

Tests Used

Gamma, Chi square, kendall tau-b, Somer's

Decision Rule

Reject H_o if alpha (5%) is greater than or equal to p-value. So we accept/reject H_o.

In our sample NUST Schools are related to use of emotional response index variable in checking usage of DST in schools in NUST. This suggests that results in checking usage of DST were significantly different due to different schools. It seems that DST may be better explained by variable Schools refer to the appendix for details on decision rule.

According to the cross tab results all students have given an answer to this and there are no missing cases. From the 12 students from NUST Business School 9 students marked medium on emotional response, and 1 marked high. In other schools no one gave a high score to emotional response. They were mostly in the low category as from total 50 respondents 21 said low and 28 marked medium for this variable.

2. H_o: NUST Schools and learning are not related
   H_1: NUST Schools and learning are related

Tests Used

Gamma, Chi square, kendall tau-b, Somer's

Decision Rule

Reject H_o if alpha (5%) is greater than or equal to p-value. So we accept/reject H_o.

In our sample NUST Schools are related to use of learning index variable in checking usage of DST in schools in NUST. This suggests that results in checking usage of DST were significantly different due to different schools. It seems that DST may be better explained by variable Schools. Chi square is accepting HO but other all tests are rejecting HO refer to the appendix for details on decision rule.

According to the learning barometer there were no records found for the high category but 42 respondents marked low and 8 marked high for digital storytelling as a learning tool. ASAB, SCME and IESE were those schools which completely said low without any chances of medium or high.

3. H_o: Department and learningare not related
   H_1: Department and learning are related

Tests Used

Gamma, Chi square, kendall tau-b, Somer's

Decision Rule

Reject H_o if alpha (5%) is greater than or equal to p-value. So we accept/reject H_o.

In our sample with help of Gamma, kendall's Tau-b and Somer's we may conclude that NUST departments are related to use of learning variable in checking usage of DST in schools in NUST refer to the appendix for details on decision rule. This suggests that results in checking usage of DST were significantly different due to different departments. It seems that DST may explained by variable departments.

According to the cross tab results from among the 42 which marked low score to learning index, 16 were from Business Studies, Social and Natural Sciences and architecture department, 13 from Engineering, IT and computer sciences, and 12 from Medicine and Applied Biosciences. And among the high score 6 were from Business Studies, Social and Natural Sciences and architecture department, 2 were from Engineering, IT and computer sciences.

For Faculty:

4. H_o: NUST Schools and emotional response are not related
   H_1: NUST Schools and emotional response are related

Tests Used

Gamma, Chi square, kendall tau-b, Somer's

Decision Rule

Reject H_o if alpha (5%) is greater than or equal to p-value. So we accept/reject H_o accordingly.

According to Somer's, kendall-b and Gamma in our sample NUST School variable is related with emotional response variable for faculty in checking usage of DST in schools in NUST refer to the appendix for details on decision rule. This suggests that results in checking usage of DST were significantly different due to form NUST Schools they were teaching. It seems that DST may be better explained by NUST schools.

According to the cross tab results from 11 faculty members of NBS, 9 gave a low score and 2 gave a medium score. From CAMP we took 5 faculty members, 4 gave mediums score and 1 low. From SEECS, SADA, ASAB, SCME, and IESE the whole sample size which we took from each school gave a low score.

5. H_o: Department and enthusiasm are not related
   H_1: Department and enthusiasm are related

Tests Used

Gamma, Chi square, kendall tau-b, Somer's

Decision Rule

Reject H_o if alpha (5%) is greater than or equal to p-value. So we accept/reject H_o accordingly.

According to Somer's, kendall-b and Gamma in our sample department variable is related with enthusiasm variable for faculty in checking usage of DST in schools in NUST refer to appendix for further details on decision rule. This suggests that results in checking usage of DST were significantly different due to form departments they were teaching. It seems that DST may be better explained by departments.

According to the cross tab results out of the 22 faculty members from the Business Studies, Social and Natural Sciences department 9 gave a low score, 5 gave a high score and 8 gave a medium score for enthusiasm in relation to digital story telling. From the 21 engineering department faculty members 9 gave low score and 12 gave medium score. From the 7 medical department faculty members 3 gave low score and 4 gave high score.

6. H_o: Department and Learning are not related
   H_1: Department and Learning are related

Tests Used

Gamma, Chi square, kendall tau-b, Somer's

Decision Rule

Reject H_o if alpha (5%) is greater than or equal to p-value. So we accept/reject H_o.

According to Somer's, kendall-b and Gamma in our sample department variable is related with learning variable for faculty in checking usage of DST in schools in NUST refer to appendix for further details on decision rule. This suggests that results in checking usage of DST were significantly different due to the departments in which they were teaching. It seems that DST may be better explained by departments.

According to the cross tab analysis 14 faculty members from total of 22 members of Business department gave a low score. From the total sample size of 50 faculty members 39 gave a low score and 11 gave a medium score. High score was not marked by anyone. Out of 39 low medicine were 7 and engineering were 18.

7. H_o: Age and enthusiasm are not related
   H_1: Age and enthusiasm are related

Tests Used

Gamma, Chi square, kendall tau-b, Somer's

Decision Rule

Reject H_o if alpha (5%) is greater than or equal to p-value. So we accept/reject H_o.

In our sample with help of Gamma, kendall's Tau-b and Somer's we may conclude that age of faculty is linked with learning variable in checking usage of DST in schools in NUST refer to appendix for further details on decision rule. This suggests that results in checking usage of DST were significantly different due to different age brackets of faculty. It seems that DST may explained by variable age.

According to the cross tab results age category of high had 21 faculty members, and from among them 15 gave medium score to enthusiasm, and from the low category of 29 faculty members, 9 gave medium score to enthusiasm.

8. H_o: Total Teaching experience and enthusiasm are not related
   H_1: Total Teaching experience and enthusiasm are related

Tests Used

Gamma, Chi square, kendall tau-b, Somer's

Decision Rule

Reject H_o if alpha is greater than or equal to p-value. So we accept/reject H_o.

In our sample Total Teaching experience of faculty is related with enthusiasm variable in checking usage of DST in schools in NUST refer to appendix for further details on decision rule. This suggests that results in checking usage of DST were significantly different due to Total experience of faculty. It seems that DST may be better explained by variable Total experience of faculty.

According to the cross tab results from the 50 faculty members' results, 5 marked high, 21 marked low and 24 marked medium to enthusiasm variable. 4 faculty members with total teaching experience of 1 year gave low score, and with 8 years total teaching experience 4 faculty members gave medium score and so forth.

9. H_o: Techniques used and learning are not related
   H_1: Techniques used and learning are related

Tests Used

Gamma, Chi square, kendall tau-b, Somer's

Decision Rule

Reject HO if alpha (5%) is greater than or equal to p-value. So we accept/reject Ho.

In our sample Techniques used by faculty is related with learning variable in checking usage of DST in schools in NUST refer to appendix for further details on decision rule. This suggests that results in checking usage of DST were significantly different due to Techniques used. It seems that DST may be better explained by variable different techniques being used by faculty members.

According to the cross tabs result among the 50 faculty members of NUST, 7 used Youtube and among them 6 gave a medium learning score, 14 used images for preparing lectures and gave low score to it. There were 5 members who do not use digital story telling techniques so among them 3 gave low score and 2 gave medium score. Members using more than 2 techniques were 14 and all of them gave a low score.

Discussion

According to the results both students and faculty gave almost a similar response pattern especially if you see the above results of NUST Schools and emotional response of both the parties was unanimously. It meant that digitals storytelling, due to its ability to catch attention and make a movie in front of your eyes, enables you to generate an emotional response like attention, collaborative learning and role play. The other similar pattern we noted was between department and learning; both faculty members and students had a similar response. It is because a department has a very positive effect on your selection of answers, in these 4-5 months of our research work we actually found out that mostly the social sciences department people actually understand what digital storytelling is and they were the only ones who gave a reasonable score on the Likert scale. From the department, NUST Business School students and faculty gave a very positive response.

Age is a variable which was not a concern in case of students due to majority of the respondents falling in the same age bracket (18 to 24), but age had an important affect in case of faculty members as age and adaption of new technology has relationship, as younger faculty is keener towards enthusiasm in using this digital story telling techniques. Techniques used had a positive relationship with digital storytelling, as the people who selected YouTube were the same people who gave the medium/high score. It shows that YouTube usage has improved the learning of students and created a new teaching and learning environment.

There were some variables not resulting in a good score, and they had no relationship in working of digital story telling in the National University of Science and Technology. The variables which had no role to play were gender, work experience at NUST, Qualification of faculty in terms of faculty while in case of students it was previous schooling, age, gender and DST techniques used. It indicated that our model might have missed out some other complex or indirect variables from the conducted study.

Furthermore, since our study was only related to NUST hence previous schooling and qualification did not have a role play at NUST but it does not imply that qualification and previous schooling will not have any affect in case of other schools too because there are certain Universities where these variables will have a significant direct or indirect role to play.

Conclusion

Digital Storytelling techniques have been playing a very significant role in the education sector via enhancing and enriching the learning experience of students resulting in the increased average performance. Faculty members have also experienced a motivation for a more collaborative, innovative and engaging teaching experience. The field of digital storytelling provides multitude opportunities for educational purposes with the continuous evolution of teaching methodologies ranging from the use of images to virtual universities and 3D imageries.

Our research is based on two dimensional study of the use of digital storytelling by the faculty and its effectiveness on the student learning and performance. However the study has been limited to the schools and departments of National University of Science and Technology, Pakistan. NUST H-12, Islamabad campus provides a very vast scope in terms of its departments such as social sciences, applied biosciences, arts and designing, pure sciences and engineering.

Our study was conducted over a sample size of 100 respondents divided equally between students and faculty and proportionately between departments. Our findings show a positive relationship between the use of digital storytelling techniques and increased learning and performance among students. A positive attitude was also observed among the faculty members but the actual usage of DST was restricted by the respective departments of the faculty members. Hence the study shows an increased usage of digital storytelling techniques in the social sciences department at NUST.

A few limitations faced by us while conducting the study were the restricted time and resources, availability of varying degree of digital infrastructure and bureaucratic structure of the institution. These limitations affected the results indirectly. The scope of this study can be further expanded to accommodate other institutions of Pakistan in various regions. Likewise the study can also be conducted over the South Asian region to identify other complex variables in terms of faculty openness and previous teaching experience as these variables might have a significant effect on the results.

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Annexure

For Students

(1) Crosstab

Count

		emotionalresponse.index			Total
		high	low	medium	
NUST Schools	NBS	1	2	9	12
	CAMP	0	1	4	5
	SEECS	0	4	5	9
	SADA	0	2	3	5
	ASAB	0	8	4	12
	SCME	0	2	2	4
	IESE	0	2	1	3
Total		1	21	28	50

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	10.532[a]	12	.569
Likelihood Ratio	10.674	12	.557
N of Valid Cases	50		

a. 16 cells (76.2%) have expected count less than 5. The minimum expected count is .06.

Directional Measures

			Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Ordinal by Ordinal	Somers' d	Symmetric	-.238	.121	-2.003	.045
		NUST Schools Dependent	-.311	.160	-2.003	.045
		emotionalresponse.index Dependent	-.193	.096	-2.003	.045

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Symmetric Measures[c]

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.417			.569
Ordinal by Ordinal	Kendall's tau-b	-.245	.124	-2.003	.045
	Gamma	-.367	.183	-2.003	.045
N of Valid Cases		50			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Correlation statistics are available for numeric data only.

2. Crosstab

Count

		learning.index		Total
		low	medium	
NUST Schools	NBS	10	2	12
	CAMP	3	2	5
	SEECS	7	2	9
	SADA	3	2	5
	ASAB	12	0	12
	SCME	4	0	4
	IESE	3	0	3
Total		42	8	50

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.168[a]	6	.226
Likelihood Ratio	10.159	6	.118
N of Valid Cases	50		

a. 11 cells (78.6%) have expected count less than 5. The minimum expected count is .48.

Directional Measures

			Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Ordinal by Ordinal	Somers' d	Symmetric	-.173	.078	-1.982	.047
		NUST Schools Dependent	-.351	.151	-1.982	.047
		learning.index Dependent	-.115	.058	-1.982	.047

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Symmetric Measures[c]

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.375			.226
Ordinal by Ordinal	Kendall's tau-b	-.201	.090	-1.982	.047
	Gamma	-.407	.176	-1.982	.047
N of Valid Cases		50			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Correlation statistics are available for numeric data only.

3. Crosstab

Count

		learning.index		Total
		low	medium	
Department.index		1	0	1
	Business Studies, Social and Natural Sciences and Architecture	16	6	22
	Engineering, IT and Computer Sciences	13	2	15
	Medicine and applied BioSciences	12	0	12
Total		42	8	50

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.636[a]	3	.201
Likelihood Ratio	6.405	3	.093
N of Valid Cases	50		

a. 5 cells (62.5%) have expected count less than 5. The minimum expected count is .16.

Directional Measures

			Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Ordinal by Ordinal	Somers' d	Symmetric	-.231	.086	-2.287	.022
		Department.index Dependent	-.399	.140	-2.287	.022
		learning.index Dependent	-.163	.072	-2.287	.022

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Symmetric Measures[c]

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.291			.201
Ordinal by Ordinal	Kendall's tau-b	-.255	.095	-2.287	.022
	Gamma	-.626	.206	-2.287	.022
N of Valid Cases		50			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Correlation statistics are available for numeric data only.

For Faculty

4. Crosstab

Count		emotionalresponse.index		Total
		low	medium	
NUST Schools	NBS	9	2	11
	CAMP	1	4	5
	SEECS	11	0	11
	SADA	6	0	6
	ASAB	7	0	7
	SCME	5	0	5
	IESE	5	0	5
Total		44	6	50

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	26.928[a]	6	.000
Likelihood Ratio	21.257	6	.002
N of Valid Cases	50		

a. 10 cells (71.4%) have expected count less than 5. The minimum expected count is .60.

Directional Measures

			Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Ordinal by Ordinal	Somers' d	Symmetric	-.259	.061	-2.685	.007
		NUST Schools Dependent	-.644	.110	-2.685	.007
		emotionalresponse. index Dependent	-.162	.060	-2.685	.007

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.592			.000
Ordinal by Ordinal	Kendall's tau-b	-.323	.076	-2.685	.007
	Gamma	-.702	.121	-2.685	.007
N of Valid Cases		50			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

5. Crosstab

Count

		enthusiasm.index			Total
		High	Low	Medium	
Department.index	Business Studies, Social and Natural Sciences and	5	9	8	22
	Engineering, IT and Computer Sciences	0	9	12	21
	Medicine and Applied BioSciences	0	3	4	7
Total		5	21	24	50

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.483[a]	4	.112
Likelihood Ratio	9.358	4	.053
N of Valid Cases	50		

a. 5 cells (55.6%) have expected count less than 5. The minimum expected count is .70.

Directional Measures

			Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Ordinal by Ordinal	Somers' d	Symmetric	.252	.123	2.004	.045
		Department.index Dependent	.258	.122	2.004	.045
		enthusiasm.index Dependent	.246	.124	2.004	.045

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.361			.112
Ordinal by Ordinal	Kendall's tau-b	.252	.123	2.004	.045
	Gamma	.416	.193	2.004	.045
N of Valid Cases		50			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

6. Crosstab

Count

		learning.index		Total
		low	medium	
Department.index	Business Studies, Social and Natural Sciences and	14	8	22
	Engineering, IT and Computer Sciences	18	3	21
	Medicine and Applied BioSciences	7	0	7
Total		39	11	50

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.348[a]	2	.069
Likelihood Ratio	6.625	2	.036
N of Valid Cases	50		

a. 3 cells (50.0%) have expected count less than 5. The minimum expected count is 1.54.

Directional Measures

			Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Ordinal by Ordinal	Somers' d	Symmetric	-.300	.102	-2.609	.009
		Department.index Dependent	-.417	.139	-2.609	.009
		learning.index Dependent	-.235	.089	-2.609	.009

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.311			.069
Ordinal by Ordinal	Kendall's tau-b	-.313	.107	-2.609	.009
	Gamma	-.681	.187	-2.609	.009
N of Valid Cases		50			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

7. Crosstab

Count

		enthusiasm.index			Total
		High	Low	Medium	
Age.index	High	1	5	15	21
	Low	4	16	9	29
Total		5	21	24	50

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.986[a]	2	.018
Likelihood Ratio	8.217	2	.016
N of Valid Cases	50		

a. 2 cells (33.3%) have expected count less than 5. The minimum expected count is 2.10.

Directional Measures

			Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Ordinal by Ordinal	Somers' d	Symmetric	-.374	.122	-3.029	.002
		Age.index Dependent	-.343	.114	-3.029	.002
		enthusiasm.index Dependent	-.411	.134	-3.029	.002

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.371			.018
Ordinal by Ordinal	Kendall's tau-b	-.375	.123	-3.029	.002
	Gamma	-.641	.175	-3.029	.002
N of Valid Cases		50			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

8. Crosstab

Count

		enthusiasm.index			Total
		High	Low	Medium	
Total Teaching experience	1	0	4	0	4
	2	2	3	1	6
	2.5	0	1	2	3
	3	2	2	1	5
	4	1	1	3	5
	5	0	5	3	8
	6	0	3	0	3
	6.5	0	0	1	1
	7	0	1	4	5
	8	0	1	4	5
	9	0	0	2	2
	10	0	0	2	2
	12	0	0	1	1
Total		5	21	24	50

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	33.941[a]	24	.086
Likelihood Ratio	38.090	24	.034
N of Valid Cases	50		

a. 39 cells (100.0%) have expected count less than 5. The minimum expected count is .10.

Directional Measures

			Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Ordinal by Ordinal	Somers' d	Symmetric	.416	.076	5.288	.000
		Total Teaching experience Dependent	.529	.097	5.288	.000
		enthusiasm.index Dependent	.342	.064	5.288	.000

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.636			.086
Ordinal by Ordinal	Kendall's tau-b	.426	.078	5.288	.000
	Gamma	.569	.101	5.288	.000
N of Valid Cases		50			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

9. Crosstab

Count

		learning.index		Total
		low	medium	
What is/are the DST techniques used while conducting Lectures	Youtube	1	6	7
	Images	14	0	14
	None	3	2	5
	Any 2	7	3	10
	More than 2	14	0	14
Total		39	11	50

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	25.774[a]	4	.000
Likelihood Ratio	28.002	4	.000
N of Valid Cases	50		

a. 6 cells (60.0%) have expected count less than 5. The minimum expected count is 1.10.

Directional Measures

			Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Ordinal by Ordinal	Somers' d	Symmetric	-.327	.105	-2.758	.006
		What is/are the DST techniques used while conducting Lectures Dependent	-.531	.164	-2.758	.006
		learning.index Dependent	-.236	.084	-2.758	.006

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Approx. Sig.
Nominal by Nominal	Contingency Coefficient	.583			.000
Ordinal by Ordinal	Kendall's tau-b	-.354	.113	-2.758	.006
	Gamma	-.576	.167	-2.758	.006
N of Valid Cases		50			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.