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Impact of Projector uses in the Class Room of the Department of Statistics, RU: A a2i based investigation

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Abstract

The main aim of this study was to investigate the impact of projector use in the class room. A random sample of size 100 has been taken from 2nd, 3rd and 4th year students with proportional allocation. Various statistical techniques specially, stepwise regression and correspondence analysis were considered for data analysis. Among the findings, the most important one is "if the teachers use both projector and white board in the class room then the performance of the students together with their results (GPA) will be increased". Thus, this study suggested that the teacher should use both projector and white board in their lecture.

Keywords: Projector, proportional allocation, Impact of result, correspondence analysis, correlation and regression

AMS Classification: 62F10, 62H20, 62G07.

1. Introduction

Education is the backbone in the development of any nation. It is a fact, the countries that have an effective system of education also happen to be the leaders of the world, both socially and economically. In short it is education, which can turn the population of any country from a burden to human resource.

The key to development is good education system, which is solely based on negligible problems for both the teachers and the students. In this project we will

be discussing the problems being faced by both the Teachers and Students in our education system.

In a competitive world, we want the best technological tools in the classroom that will offer superior advantages for both teachers and students. Previously, teachers used chalkboard in this department but now the system is changing, and most of the teachers are using whiteboard with marker pen. But now often it is seen that some teacher's are using multimedia projector in classroom. Technology has been offering advantage for years and continues to raise the bar through innovations that expand instructional reach for teachers and lower the total cost of ownership for school, college or university.

University students are an important element of the youth population of a country. The youth of a country are of special interest to all those who are concerned with growth and development of the country. It has been realized that significant explosion of knowledge related to technology is increasing day by day raising the productivity of the population. It is, therefore, very essential that human values should also develop simultaneously with technology. There is a need to develop a balance between development of science and technology on one hand and development of values and spirit on the other hand. These all, present a demand to change the educational system in general and higher education in particular. As we all know that teaching is not a one way process, teaching and learning are components of on common process. In this article, we will discuss some problems those students are facing and how to remove such problems.

Tiwari, S.K. *et al.* (2015) did not found any significance effect of new teaching techniques on central government and private school teachers. Frequently usage of ICT in teaching learning process will enhance the quality of sciences education in Higher Education Institutions. It is recommended that trainings on attitudinal changes, skill development and motivational awards based competency are provided for instructors for a better practice of ICT supported science teaching learning process (Endris A. E., 2016).Digital classrooms are considered as the vital element in promoting and improving the traditional methods of teaching and learning. So all schools and universities focus on it, and try to attract more virtual students. Timesaving is one of the most important consequences of digital classroom on education (Vahideh Z. M. *et al.*, 2011). According to the field notes of classroom observations made by researchers, the ceaseless interactive actions unexpectedly leaded students to become continually multi-tasking which

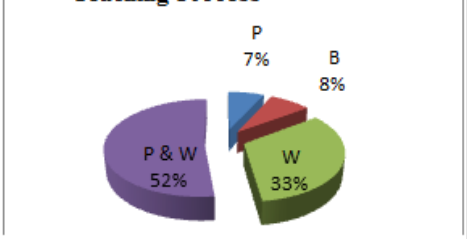
frequently interrupts students' learning processes (Kirsh, 2000; Oliver, 1996). Instructor or students had to spend a lot of time interacting with the interactive projector, with some of these interactive actions being complex. This causes students to divert their attentions between the learning materials, instructors, peers and teaching media due to the use of interactive projector in the classrooms, resulting in extremely heavy cognitive load (Mayer & Moreno, 2003). In effect, interactive whiteboards can move students from being one-dimensional thinkers to well rounded critical thinkers who have a repertoire of experiences to pull from (Averis *et al.,* 2004). It represented that teaching based on the use of technology had a significant positive effect on learners' scores. Analyses showed that the experimental group learners performed better than the control group. The study results show that technology plays a big role in language classes; it can be used as a tool to facilitate teaching and learning. As one of the most important goals of using new ways of teaching language in secondary schools is to promote students' motivation towards learning, we can see in this study that using power point presentations operates as a powerful pedagogical tool in English classes. This study supports the effect of superiority of technology-based lessons as compared to traditional lessons. English teachers should consider their students' needs and interests, and the questionnaire results indicate that the majority of the students show their positive perceptions towards using technology in English classes (Fateme S. L., 2014). Similar research were conducted by (Corbeil, G. 2007, Ilter, B. G., 2009 and Oommen, A., 2012).

2. Purpose of this research

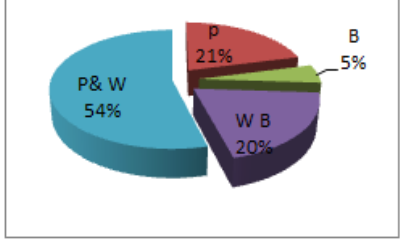
Behind every work has a nice and meaningful objective. The main objectives of this study is to identify the effect of teaching system in student’s academic result

2.1 Study Population

All the students of the department of statistics, Rajshahi University is the population of this research. A random sample of size 100 has been taken from 2^{nd} ,3^{rd} and 4^{th} year students with proportional allocation (Singh, D. And Chaudhary F.S. ,1966) from each class.. Since we need the results of the students to analyze the effectiveness of teaching system, so we omit new comer (first year student) and msc student.



Percentage distribution of by teaching process



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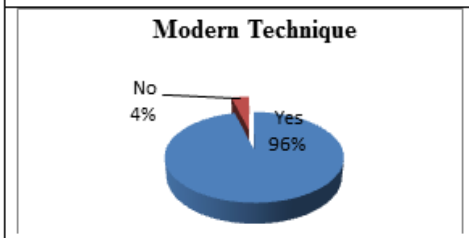
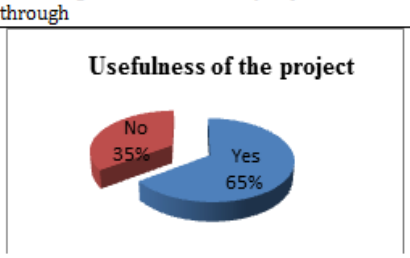
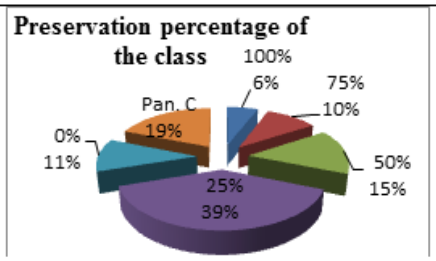


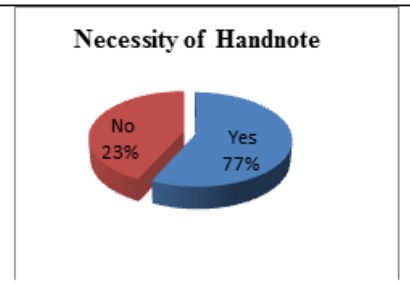
Percentage distribution of by modern technique



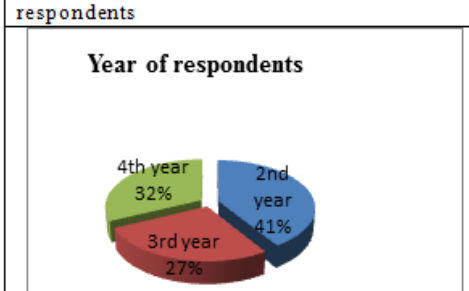
Percentage distribution of by usefulness of the projector



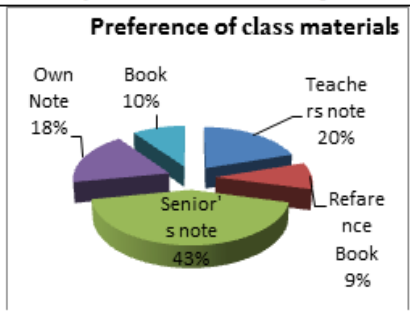
Preservation percentage of the class of the respondents



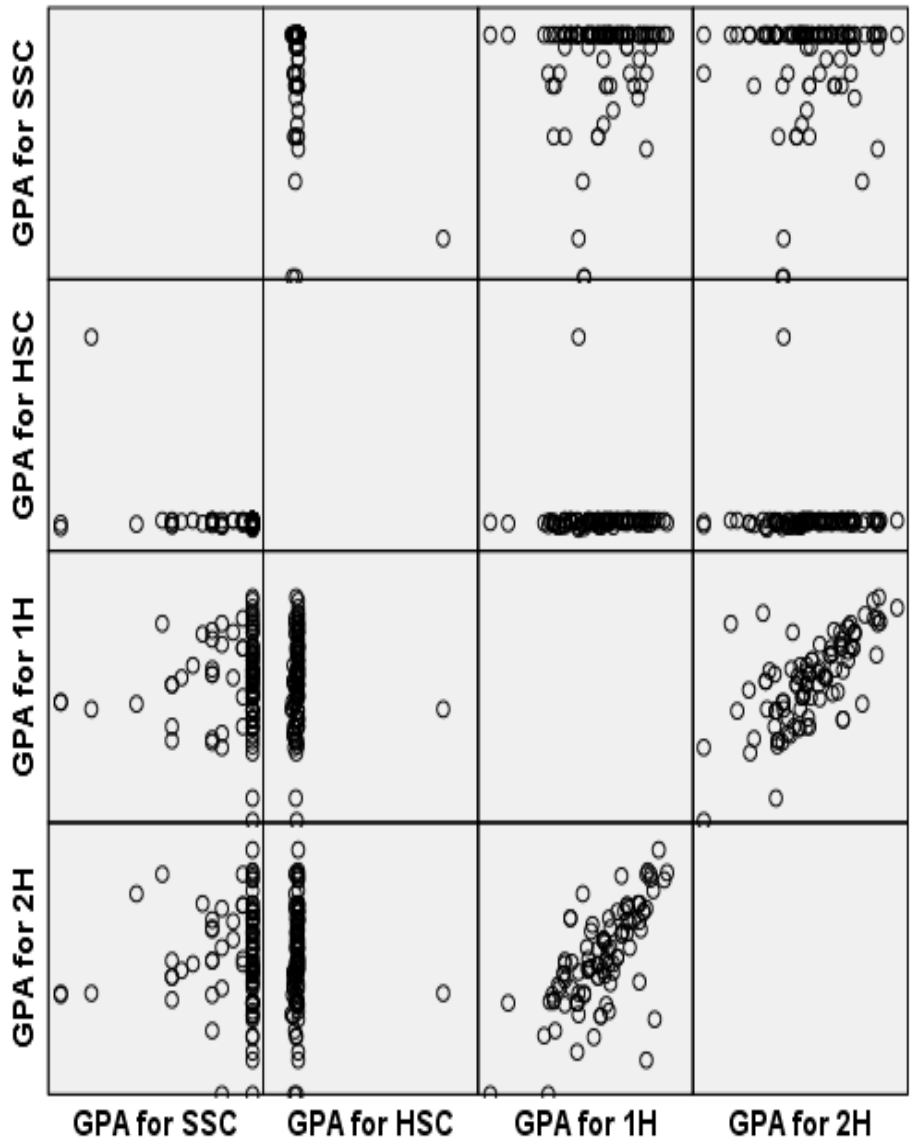
Necessity of hand note of the respondents



Percentage distribution of the respondents by their year of respondent.



Preference of class materials of the respondents.



From scatter plot we may conclude that the result of 2nd year students is related to the result of first year only.

Correlation Analysis:

Table shows the correlation coefficient among the result of different years including SSC and HSC examination

Correlation

		GPA for SSC	GPA for HSC	GPA for 1H	GPA for 2H	GPA for 3H	GPA for 4H
GPA for SSC	Pearson Correlation	1	-.352(**)	.104	-.019	-.158	.116
	Sig. (2-tailed)		.000	.303	.855	.117	.248
GPA for HSC	Pearson Correlation	-.352(**)	1	-.029	.010	.047	-.055
	Sig. (2-tailed)	.000		.774	.921	.641	.589
GPA for 1H	Pearson Correlation	.104	-.029	1	.499(**)	.028	-.031
	Sig. (2-tailed)	.303	.774		.000	.786	.763
GPA for 2H	Pearson Correlation	-.019	.010	.499(**)	1	.198(*)	.112
	Sig. (2-tailed)	.855	.921	.000		.049	.267
GPA for 3H	Pearson Correlation	-.158	.047	.028	.198(*)	1	.454(**)
	Sig. (2-tailed)	.117	.641	.786	.049		.000
GPA for 4H	Pearson Correlation	.116	-.055	-.031	.112	.454(**)	1
	Sig. (2-tailed)	.248	.589	.763	.267	.000	

** Correlation is significant at the 0.01 level (2-tailed).* Correlation is significant at the 0.05 level (2-tailed).

From the above correlation we can see that, result of second year is positively correlated and significant at 0.01 level (2-tail) with result of first year respectively.

Regression Analysis:

Regression Analysis is concerned with the study of dependence of one variable, on one or more explanatory variables with a view to estimating or predicting the mean or average value of the former in terms of the known or fixed values of the latter.

Our assumed regression model is

$Y = B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + U$

Where,

Y=GPA for 2^{nd} year**.**

X_1 = GPA for 1^{st} year**.**

X_2= GPA for 3^{rd} year.

X_3=GPA for 4^{th} year.

X_4 = GPA for SSC.

X_5 = GPA for HSC.

$u_i \sim NID(0, \sigma^2 I)$ and $X_i's$ are fixed over repeated sample.

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	-.160	1.275		-.126	.900	-2.692	2.371
GPA for 1H	1.148	.200	.503	5.732	.000	.750	1.545
GPA for 3H	.051	.036	.144	1.425	.157	-.020	.122
GPA for 4H	.024	.035	.069	.687	.494	-.045	.093
GPA for SSC	-.131	.227	-.056	-.575	.567	-.582	.321
GPA for HSC	.000	.017	.002	.023	.981	-.033	.034

a. Dependent Variable: GPA for 2H

Finally, we have the estimated regression line is,

$$Y=-0.160+1.149X_1+0.051X_2+0.024X_3-0.131X_4+0.00X_5$$

Here, Regression suggested that the results of 2nd year (Y) depends only on the 1st year results (X_1) but not on that of 3rd year(X_2), 4th year(X_3), SSC (X_4)and HSC (X_5).

Using SPSS, we have the following results from stepwise regression analysis:

Estimated value of the coefficients:

Test of hypothesis

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	-.734	.674		-1.089	.279	-2.071	.604
GPA for 1H	1.127	.196	.494	5.747	.000	.738	1.516
GPA for 3H	.065	.030	.184	2.140	.035	.005	.125

a. Dependent Variable: GPA for 2H

b. Predictors: (Constant), GPA for 1H, GPA for 3H

Here, stepwise regression suggested that the results of 2^{nd} year (Y) depends only on the 1^{st} year results (X_1) but not on that of 3^{rd} year(X_2), 4^{th} year(X_3), SSC (X_4)and HSC (X_5).

Correspondence Analysis:

One of the goals of correspondence analysis (Bishop, Y. M. ***Et al,*** 1977) is to describe the relationships between two nominal variables in a correspondence table in a low-dimensional space, while simultaneously describing the relationships between the categories for each variable. For each variable, the distances between category points in a plot reflect the relationships between the categories with similar categories plotted close to each other. Projectingpoints for one variable on the vector from the origin to a category point for the other variable describe the relationship between the variables.

An analysis of contingency tables often includes examining row and column profiles and testing for independence via the chi-square statistic. However, the number of profiles can be quite large, and the chi-square test does not reveal the dependence structure. The Crosstabs procedure offers several measures of association and tests of association but cannot graphically represent any relationships between the variables.

Data. Categorical variables to be analyzed are scaled nominally. For aggregated data or for a correspondence measure other than frequencies, use a weighting

variable with positive similarity values. Alternatively, for table data, use syntax to read the table.

Assumptions. The maximum number of dimensions used in the procedure depends on the number of active rows and column categories and the number of equality constraints. If no equality constraints are used and all categories are active, the maximum dimensionality is one fewer than the number of categories for the variable with the fewest categories. For example, if one variable has five categories and the other has four, the maximum number of dimensions is three. Supplementary categories are not active. For example, if one variable has five categories, two of which are supplementary, and the other variable has four categories, the maximum number of dimensions is two. Treat all sets of categories that are constrained to be equal as one category. For example, if a variable has five categories, three of which are constrained to be equal, that variable should be treated as having three categories when determining the maximum dimensionality. Two of the categories are unconstrained, and the third category corresponds to the three constrained categories. If you specify a number of dimensions greater than the maximum, the maximum value is used.

Related procedures. If more than two variables are involved, use multiple correspondence analysis. If the variables should be scaled ordinals, use categorical principal components analysis.

Statistics and plots. Correspondence measures, row and column profiles, singular values, row and column scores, inertia, mass, row and column score confidence statistics, singular value confidence statistics, transformation plots, row point plots, column point plots, and bi-plots.

Correspondence Analysis Between Teaching Process and Usefulness of the Projector:

Correspondence Table

Usefulness of the projector	Teaching Process				
	Projector	Blackboard	Whiteboard	Projector &Whiteboard	Active Margin
No	2	3	15	15	35
Yes	5	5	18	37	65
Active Margin	7	8	33	52	100

The correspondence table shows the distribution of Teaching Process for two levels of Usefulness of the projector. The rows of the correspondence table represent the Usefulness of the project. The columns represent the Teaching Process.

Row Profiles

Usefulness of the project	Teaching Process				
	Projector	Blackboard	Whiteboard	Projector & Whiteboard	Active Margin
No	.057	.086	.429	.429	1.000
Yes	.077	.077	.277	.569	1.000
Mass	.070	.080	.330	.520	

Column Profiles

Usefulness of the projector	Teaching Process				
	Projector	Blackboard	Whiteboard	Projector &Whiteboard	Mass
No	.286	.375	.455	.288	.350
Yes	.714	.625	.545	.712	.650
Active Margin	1.000	1.000	1.000	1.000	

To determine the distance between categories, correspondence analysis (Greenacre, M. J. 1984) considers the marginal distributions as well as the individual cell frequencies. It computes row and column profiles, which give the row and column proportions for each cell, based on the marginal totals. The row profiles indicate the proportion of the row category in each column category. For example, among the students, most are in favor of using projector.

Mass is a measure that indicates the influence of an object based on its marginal frequency. Mass affects the centroid, which is the weighted mean row or column profile. The row centroid is the mean row profile. Points with a large mass, like junior employees, pull the centroid strongly to their location. If we prefer to think of difference in terms of distance, then the greater the difference between row profiles, the greater the distance between points in a plot.

Summary

Dimension	Singular Value	Inertia	Chi Square	Sig.	Proportion of Inertia		Confidence Singular Value
					Accounted for	Cumulative	Standard Deviation
1	.161	.026			1.000	1.000	.101
Total		.026	2.600	.457[a]	1.000	1.000	

a. 3 degrees of freedom

It is possible to compute the inertia displayed by a particular dimension. The scores on each dimension correspond to an orthogonal projection of the point onto that dimension. Thus, the inertia for a dimension equals the weighted sum of the squared distances from the scores on the dimension to the origin. However, whether this applies to row or column scores (or both) depends on the normalization method used.

Correspondence Analysis Between Teaching Process and Academic Results:

Teaching Process	G2H_C			
	GPA Less than 3.00	GPA 3.00-GPA 3.49	GPA 3.50 and above	Active Margin
Projector	1	6	0	7
Blackboard	3	3	2	8
Whiteboard	2	16	15	33
Projector &Whiteboard	5	31	16	52
Active Margin	11	56	33	100

Table: The students who have good results are interested that if the teacher use Projector & Whiteboard then it would help them to understand the class lecture well.

Dimension	Singular Value	Inertia	Chi Square	Sig.	Proportion of Inertia		Confidence Singular Value	
					Accounted for	Cumulative	Standard Deviation	Correlation 2
1	.275	.075			.622	.622	.113	.178
2	.214	.046			.378	1.000	.097	
Total		.121	12.140	.059[a]	1.000	1.000		

a. 6 degrees of freedom

It is possible to compute the inertia displayed by a particular dimension. The scores on each dimension correspond to an orthogonal projection of the point onto that dimension. Thus, the inertia for a dimension equals the weighted sum of the squared distances from the scores on the dimension to the origin. However, whether this applies to row or column scores (or both) depend on the normalization method used.

Summary and conclusion

The key to development is good education system, which is solely based on negligible problems for both the teachers and the students. In this research, we have found that the maximum teacher use projector and whiteboard (52%), projector (7%), whiteboard (33%) and blackboard (8%) to teach their student in class room.

We also see that there is a positive correlation between the class attendance and students final examination result. Stepwise regression suggested that the results of 2^{nd} year depends only on the 1^{st} year results but not on that of SSC and HSC. From the correspondence analysis we have the conclusion as: i) among the students, most are in favor of using projector ii) *using of projector and white board* have greater both row and column Mass iii) strong relationship between higher GPA (>3.50) and using projector & white board was found from this analysis.

Thus, this research suggested that teacher should use both projector and white board in the class room to improve the performance of students together with their academic results.

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