

December 8,9 2018











PROCEDNES



THE NINTH INTERNATIONAL CONFERENCE ON SCIENCE AND ENGINEERING, 2018 (9th ICSE 2018)

Scope

The Ninth International Conference on Science and Engineering, 2018 (9th ICSE 2018) organized by Yangon Technological University (YTU), Myanmar. The conference will be held in Yangon Technological University (YTU), Yangon, Myanmar from 8th to 9th December, 2018. The Ninth International Conference on Science and Engineering, 2018 (9th ICSE 2018) aims to bring together scientists, leading engineers, industry researchers, and candidates from postgraduate courses to share and exchange their knowledge, experiences, information, and research on science and technology.

The 9th ICSE 2018 will be held in accordance with the following objectives;

- To create opportunity for young generation scientists, engineers, technologists and technicians to gain international experience
- To get chance for gaining technical knowledge from the international experts who conduct seminars and workshops on science and technology
- ✤ To increase knowledge on science and technology by exchanging research information with international universities and research organizations
- To enhance research knowledge and experience contributing to the advancement of research capabilities in the country
- ✤ To gain experience in carrying out research activities in collaboration with international universities

A wide range of important themes in various fields of Science and Engineering will be addressed in the conference and those who are interested in science and technology are warmly welcome to participate in 9th ICSE 2018. Participants are requested to submit a proposal of academic or research paper for a 15-minute presentation and 5-minute Q&A.

This international conference would encourage researchers and engineers to present and discuss recent advances in science and engineering. ICSE feature paper presentation of the following science and engineering fields:

Electrical and Electronics (EC, EP, CEIT, Mechatronics)

> ICT (CEIT, EC, Mechatronics)

Manufacturing and Automation (Mechanical, Mechatronics, Chemical, Textile, Aero, Metallurgy)

Energy, Environment and Natural Sciences (Civil, Biotechnology, Mining, Petroleum, Metallurgy, EP, EC, Nuclear Engineering, Geology, Mechanical, Textile, Chemical, Remote Sensing, Physics, Chemistry, Mathematics, Nuclear Engineering)

Natural Disaster Prevention (Civil, Architecture, EP, EC, CEIT, Mechatronics)

> Infrastructure

(Civil, Architecture, EP, EC, CEIT, Mechanical, Remote Sensing)

Engineering Education

(Civil, Biotechnology, Mining, Petroleum, Metallurgy, CEIT, EP, EC, Nuclear Engineering, Geology, Mechanical, Mechatronics, Textile, Chemical, Remote Sensing, Physics, Chemistry, Mathematics)

Organizing Committee

General Chair

U Win Maw Tun Deputy Minister, Ministry of Education

Members

Dr. Thein Win	Director General, Department of Higher Education
U Win Khaing Moe	Director General, Department of Research and Innovation
Dr. Aye Myint	Director General, Department of Technical and Vocational
	Education and Training
Dr. Khin Maung Latt	Director General, Department of Technical Promotion and
	Coordination
Prof. U Nyi Hla Nge	Vice Chairman, National Education Policy Commission (NEPC)

Prof. Dr. Ba Myint	Member, Steering Committee for Technological Centres of
	Excellence
Prof. Dr. Kyaw Win	Member, Steering Committee for Technological Centres of
	Excellence
Prof. U Khin Maung Tin	Member, Steering Committee for Technological Centres of
	Excellence
Prof. Dr. Mya Mya Oo	Retired Rector, Yangon Technological University
Prof. Dr. Myint Thein	Rector, Yangon Technological University
Prof. Dr. Kay Thi Lwin	Rector, Technological University (Hmawbi)
Prof. Dr. Theingi	Rector, Technological University (Thanlyin)
Prof. Dr. Kyi Soe	Rector, West Yangon Technological University
Prof. Dr. Khin Than Yu	Pro-Rector, Yangon Technological University
Dr. Zaw Min Naing	Deputy Director General, Department of Research and
	Innovation

Steering Committee General Chair

Prof. Nyi Hla Nge Vice Chairman, National Education Policy Commission (NEPC) The Government of the Union of Myanmar

Members

1. Prof. Ba Myint

Member, Steering Committee for Technological Centers of Excellence, Yangon Technological University and Mandalay Technological University

2. Prof. Kyaw Win

Member, Steering Committee for Technological Centres of Excellence, Yangon Technological University and Mandalay Technological University

- Prof. Khin Maung Tin Member, Steering Committee for Technological Centres of Excellence, Yangon Technological University and Mandalay Technological University
- Prof. Dr. Aung Kyaw Myat Chief Technical Advisor, Alliance Star Group of Companies Former Deputy Minister, Ministry of Science and Technology, Myanmar
- Dr. Thein Win Director General, Department of Higher Education
- U Win Khaing Moe Director General, Department of Research and Innovation (DRI)
- Dr. Aye Myint Director General, Department of Technical and Vocational Education
- Dr. Khin Maung Latt Director General, Department of Technical Promotion and Coordination (DTPC)
- Prof. Mya Mya Oo Rector (Retired), Yangon Technological University
- 10. U Aung Myint President, Myanmar Engineering Society (MES)
- 11. Prof. Nobuo Funabiki

Department of Electrical and Communication Engineering Okayama University, Okayama, Japan

- 12. Prof. Keiji Iramina Kyushu University, Japan
- Prof. Osamu Murao The University of Tokyo, Japan
- 14. Mr. Isamu HAMADA

Projector Coordinator, Japan International Cooperation Agency (JICA)

Technical Program Committee

Aerospace Engineering	Prof. Dr. Kyi Thwin Rector Myanmar Aerospace Engineering University
Architecture	Prof. Dr. Theingi Shwe Professor and Head Department of Architecture Yangon Technological University
	Prof. Dr. Pwint Professor Department of Architecture Yangon Technological University
	Prof. Dr. Hnin Wuint Yi Professor Department of Architecture Yangon Technological University
Chemical Engineering	Prof. Dr. Tint Tint Kywe Professor and Head Department of Chemical Engineering Yangon Technological University
	Prof. Dr. Nwe Nwe Win Professor Department of Chemical Engineering Yangon Technological University
	Prof. Dr. Aung Thu Hein Lecturer Department of Chemical Engineering Yangon Technological University
Civil Engineering	Prof. Dr. Nyan Myint Kyaw Professor and Head Department of Civil Engineering Yangon Technological University

	Prof. Dr. Win Win Zin Professor Department of Civil Engineering Yangon Technological University Prof. Dr. Khin Maung Zaw Associate Professor
	Department of Civil Engineering Yangon Technological University
Electrical Power Engineering	Prof. Dr. Okka Professor and Head Department of Electrical Power Engineering Yangon Technological University Prof. Dr. Aung Zeya Professor Department of Electrical Power Engineering Yangon Technological University
Electronic Engineering	 Prof. Dr. Own Zin Lin Associate Professor Department of Electrical Power Engineering Yangon Technological University Prof. Dr. Hla Myo Htun Professor and Head Department of Electronic Engineering
	Yangon Technological University Prof. Dr. Hnin Si Professor Department of Electronic Engineering Yangon Technological University Prof. Dr. Yu Yu Lwin Professor
Computer Engineering and Information Technology	Department of Electronic Engineering Yangon Technological University Prof. Dr. Win Zaw Professor and Head, Department of Computer Engineering and Information Technology, Yangon Technological University

	Prof. Dr. Thanda Win Professor, Department of Computer Engineering and Information Technology, Yangon Technological University
Mechanical Engineering	Prof. Dr. Mi Sandar Mon Professor and Head Department of Mechanical Engineering Yangon Technological University Prof. Dr. Yin Yin Tun Professor Department of Mechanical Engineering Yangon Technological University
	Prof. Dr. Thein Min Htike Associate Professor Department of Mechanical Engineering Yangon Technological University
	Prof. Dr. Min Thaw Tun Associate Professor Department of Mechanical Engineering Yangon Technological University
Mechatronic Engineering	 Prof. Dr. La Pyae Lynn Professor and Head Department of Mechatronic Engineering Yangon Technological University Prof. Dr. Theint Theint Thu Professor Department of Mechatronic Engineering Yangon Technological University Prof. Dr. Aung Myo Thant Zin Lecturer Department of Mechatronic Engineering Yangon Technological University

Metallurgical Engineering and Material Science	Prof. Dr. Kyaw Win Tun Professor and Head Department of Metallurgical Engineering Yangon Technological University
Mining Engineering	 Prof. Dr. Myo Thura Thein Professor Department of Metallurgical Engineering Yangon Technological University Prof. Dr. Aung Lay Tin Professor and Head Department of Mining Engineering Yangon Technological University
Petroleum Engineering	Prof. Dr. Zaw Htet Aung Professor and Head Department of Petroleum Engineering Yangon Technological University
Textile Engineering	Prof. Dr. Swe Swe Hnin Professor and Head Department of Textile Engineering Yangon Technological University
	Prof. Nyi Nyi Htoo Professor Department of Textile Engineering Yangon Technological University
Engineering Chemistry	Prof. Dr. Marlar Than Professor and Head Department of Engineering Chemistry Yangon Technological University
Engineering Geology	Dr. Tun Naing Professor and Head Department of Engineering Geology Yangon Technological University
	Daw Khin Soe Moe Lecturer Department of Engineering Geology Yangon Technological University

Engineering Mathematics	Prof. Dr. Khaing Khaing Aye Professor and Head Department of Engineering Mathematics Yangon Technological University
Engineering Physics	Dr. Phyu Phyu Mar Lecturer and Head Department of Engineering Physics Yangon Technological University
English	Asso. Prof. Daw Phyu Phyu Sein
	Associate Professor and Head
	Department of English
	Yangon Technological University
Myanmar	Daw Khin Phone Tint
	Lecturer and Head
	Department of Myanmar
	Yangon Technological University
Remote Sensing	Dr. Sao Hone Pha
-	Director and Head
	Remote Sensing and GIS Research Center
	Yangon Technological University
	Dr. Kyaw Zaya Htun
	Deputy Director
	Remote Sensing and GIS Research Center
	Yangon Technological University

Table of Contents

Panel Speakers

No.	Code	Name, Title	Pages
1	EE	Nguyen Quang Huy	1
		Virtual Reference Feedback Tuning to Cascade Control System for Non-	
		Minimum Phase Systems	
2	EE	Hajime Miyauchi	6
		Optimization of Battery Charging Period of Electric Bus by Genetic Algorithm	
3	ICT	Nobuo Funabiki	10
		A Proposal of Calligraphy Learning Assistant System Using Projection Mapping	
4	MA	Daisaku Sakaguchi	16
		Measurement of Internal Flow of a Low Solidity Cascade Diffuser by Particle	
		Image Velocimeter	
5	EN	Rekola Jenni	21
		Teaching Power Electronic Converters by Using Laboratory Setups	
6	ND	Akiyuki Kawasaki	26
		Integrated analysis of the 2018 Myanmar Floods: Case in the Bago River basin	
7	IF	Takeshi YOSHIDA	31
		Project Summary of Construction for New Thaketa (Dawbon) Bridge	
8	IF	Hyuk Lee	33
		Micromechanical Properties of Calcium Silicate Hydrate in Ordinary Portland	
		Cement with Statistical Indentation Technique	
9	IF	Tsuyoshi Hyakutake	36
		Evaluation of Surface Preparation of Steel Substrate by Microscopic Surface	
		Observation	
10	IF	Trevor Htut	39
		Experimental Investigation of Post-Installed Anchors Embedded in Steel Fibre	
		Reinforced Concrete	
11	EDU	Hiroyuki Akazawa	44
		Isolation and structure elucidation of triterpenoid saponins from the bark extract	
		of Albizia procera	

The Statistical Analysis of Examination Scores for Improvement of Teaching and Learning in Mathematics^{*}

Dr. Khaing Khaing Aye^{#1}, Dr. Cho Yu Mon^{#2}, Dr. Nyo Nyo Thein^{#3}, Daw Win Myint^{#4}, Dr. Aye Aye Mon^{#5}, Dr. Sandar Lwin^{#6}, Dr. Myo Myo Thu^{*7}

[#]Department of Engineering Mathematics, Yangon Technological University, Myanmar, ^{*}Department of Engineering Mathematics, Technological University (Thanlyin), Myanmar

¹khaingkhaingaye1267@gmail.com, ²<u>choyumon681@gmail.com</u>, ³nyonyothein@gmail.com, ⁴<u>mawmyint.ytu@gmail.com</u>, ⁵<u>jasmine528@gmail.com</u>, ⁶<u>sandarlwin01@gmail.com</u>, ⁷<u>myomyothu07@gmail.com</u>

Abstract- The statistical analysis of examination results is an important work for the management of examination and it is necessary to do in order to know the teaching effectiveness, student's mastery of the knowledge and skills for quality education. In this paper, we study on the correlation and regression analysis and procedures of teaching statistical analysis based on SPSS (Statistical Package for Social Science) software, and provide an approach for the analysis of the scores in order to improve the teaching and learning in Mathematics.

Keywords - SPSS software, Correlation Coefficients, Coefficient of Determination, Regression Line, Pair Sample t- Test

I. INTRODUCTION

The statistical analysis of the examination score is an important part of the teaching process, and also is a necessary way to reflect teaching results. Therefore, it is necessary for us to do a more in-depth and detailed statistical analysis in order to know the teaching effectiveness, student's mastery of the knowledge and skills, and at the same time to regulate and guide the teacher's behavior, which help make exams truly serving quality education. The exam is one of the important methods to evaluate the quality of teaching, measure the effectiveness, and identify the quality of talents [1].

The statistical analysis of examination results is an important work for the management of examination. Its conclusions are the theoretical basis for teaching evaluation, research and reform. By analyzing examination results, in one hand, the teachers can get to know how much knowledge students have obtained. For the other hand, it can be a feedback that the quality of examination papers, which is benefit to modify the questions and make the test more standard. Therefore statistical analysis of the examination results has been suggested for identifying the problems in the examination system as well as in the teaching process of a university [2].

II. CASE STUDY

This research studies how to make an improvement of teaching and learning in Mathematics in a Technological University by the aid of SPSS software and theory of Mathematical Statistics. The data in this research work come from the examination scores of Engineering Mathematics for first year students in a Technological University.

The sample comprised 124 students from four different majors of semester 1 who enrolled in Engineering Mathematics EM- 11001 subject in their first year engineering program in the Technological University. EM-11001 subject is one of the core subjects in the course of Bachelor of Engineering. The delivery pattern is four hours of lecture and one hour of tutorial per week continuously for 15 weeks. To pass this unit, a student must achieve at least 50% overall assessment, in details, 80% of final exam, 20% of tutorial and hence 100% of total.

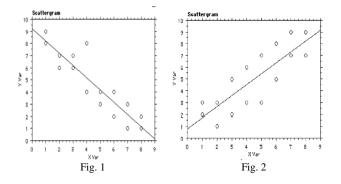
The content of EM- 11001 subject in their first year engineering program consists of Limits and Continuity, Differentiation, Integration, Complex and Vector Algebra. The examiner makes five questions in their final examination papers according to the content of EM- 11001 subject. The students have to attempt all five questions. Normally, serial of the question's numbers and the topics of the subject's contents correspond respectively.

The main idea of this research is to analyze how to make an improvement of teaching and learning in Mathematics for first year students in a Technological University. The research we are trying to analyze is that how much the sample of 124 students from four different majors can do their exam well, which question is done well among five questions, and why it is done well, by the aid of SPSS software and theory of Mathematical Statistics.

III. METHODOLOGY

On some occasions, we are interested in determining the extent to which there is a relationship between two variables. That is, we are interested in seeing if the two variables "go together" or if knowing information about one variable helps us to predict scores on the second variable.

The statistic used to assess the degree of relationship is the Pearson product-moment correlation coefficient R which can take on values from -1 to +1. Negative values of R indicate that higher scores on one variable are associated with lower scores on the other variable shown in Fig. 1. Positive values of R indicate that higher scores on one variable are associated with higher scores on the other variable and lower scores on one variable are associated with lower scores on the other variable and lower scores on one variable are associated with lower scores on the other variable are associated with lower scores on the other variable are associated with lower scores on the other variable are associated with lower scores on the other variables shown in Fig. 2 [3].



The coefficient of determination R^2 is the proportion of variability in the *y*-variable that is shared with the participants' scores on the *x*-variable [3].

IV. RESULTS AND DISCUSSION

In this section, we analyze the correlation, coefficient of determination, frequency Statistics and Paired Samples Test of the four pairs: namely,

Pair 1;"Question 1 and Question 2 marks",

Pair 2; "Question 1 and Question 3 marks",

Pair 3; "Question 1 and Question 4 marks",

Pair 4; "Question 1 and Question 5 marks".

from the final examination scores of Engineering Mathematics subject, among the sample of 124 students from four different majors. Here, we regard Q1 as an independent variable and Q 2, 3, 4 and 5 as dependent variables.

A. Correlation Analysis (4 pairs)

The following Tables 1 and 2 show the correlations of the above four pairs.

TABLE 1 PAIRED SAMPLES CORRELATIONS

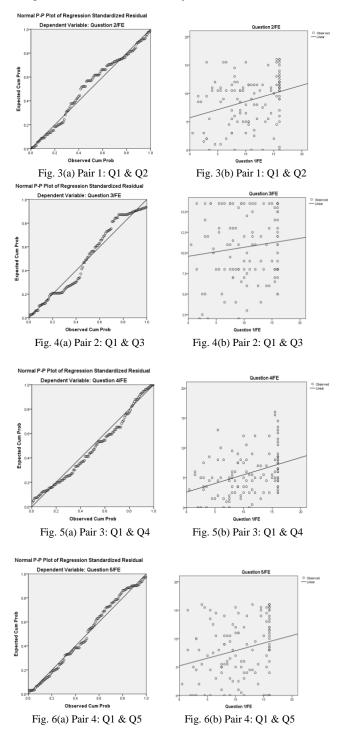
		Ν	Correlation R	Sig.
Pair 1	Q1 & Q2	124	.308	.001
Pair 2	Q1& Q3	124	.123	.174
Pair 3	Q1& Q4	124	.382	.000
Pair 4	Q1& Q5	124	.238	.008

 $TABLE\ 2 \\ CORRELATION\ R\ \text{and}\ Coefficient\ of\ Determination}\ R^2$

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
Pair 1	.308	.095	.087	4.103
Pair 2	.123	.015	.007	4.103
Pair 3	.382	.146	.139	3.253
Pair 4	.238	.057	.049	5.046

From the information shown in Tables 1 and 2, we see that, the correlation coefficient values of all Pairs are (positive) and less than 1. It means that, in general, the students who can do well the Q1 then so do the others namely, Q2, Q3, Q4 and Q5. It is noted that these are based on Q1. We can also consider other cases similarly.

Moreover, among the four pairs, the correlation of Pair 3 and Pair 2 are highest which is 0.382 and lowest which 0.123 respectively is. It means that the students who can do well the Q1 then so is Q4 and similarly, the students who cannot do the Q1 then so is Q3. The following Figures, Fig. 3 to Fig. 6, show the regression lines of the final examination scores of the above four pairs from four different majors.



From the information shown in above Figures, all the regression lines of the final examination scores are increasing. It means that, in general, students get the higher scores on both the Q1 and other questions as well.

Moreover, among the four lines, the slopes of the regression lines of Pair 3 and Pair 2 are significant conversely.

It means that if the students who get the higher scores on the Q1 then they also get the higher scores on the Q4 in Pair 3 and they get the lower scores on the Q3 in Pair 2.

B. Statistics

Tables 3 and 4 show the pair samples statistics and the mean differences of the final examination scores of the above four pairs from four different majors respectively.

	Q 1	Q 2	Q 3	Q 4	Q 5
Ν	124	124	124	124	124
Mean	10.89	8.83	10.78	5.75	8.12
Median	11.00	10.25	11.00	5.00	8.00
Mode	16	11	16	5	0
Std. D	4.613	4.295	4.118	3.506	5.174
Variance	21.284	18.443	16.956	12.291	26.766
Minimum	1	0	2	0	0
Maximum	16	16	16	16	16

TABLE 3 PAIRED SAMPLES STATISTICS

From the information shown in Table 3, we see that, compared with other questions, the values of mean and mode of Q1 and Q3 are highest. The mode 16 of Q1 and Q3 means most of the students get full marks in Q1 and Q3. It means that, in general, students get the highest scores on both Q1 and Q3.

Similarly, the mean of Q4 is lowest among them. It means that, in general, students get the lowest scores in Q4. Moreover, the mode 0 of Q5 is lowest and therefore most of the students cannot do well for Q5.

TABLE 4 PAIRED SAMPLES TEST

		Paired Differences				
		Mean	Std. D	95% C.I		
				Lower	Upper	
Pair 1	Q1&Q2	2.060	5.247	1.128	2.993	
Pair 2	Q1&Q3	.105	5.794	925	1.135	
Pair 3	Q1&Q4	5.141	4.607	4.322	5.960	
Pair 4	Q1&Q5	2.766	6.058	1.689	3.843	

In Table 4, based on Q1, we can say that in general, the exam scores of Q1 and Q4 are quite different since the mean difference of pair 3 (Q1 & Q4) is highest among all pairs. However, the exam scores of Q1 and Q2 are almost the same since the mean difference of pair 2 (Q1 & Q2) is lowest.

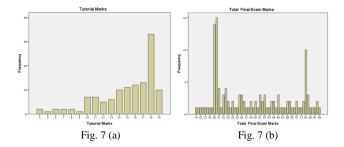
It means that if the students get the highest scores on Q1 then so is Q2. However they cannot get high scores on Q4.

C. Correlation Analysis (T & FE)

In this section, we analyze the sample statistics and correlation of tutorial marks (T) and final exam marks (FE) of Engineering Mathematics subject, among the sample of 124 students from four different majors shown in Tables 5, 6 and Figures 7, 8 respectively.

TABLE 5 SAMPLES STATISTICS (T&FE)

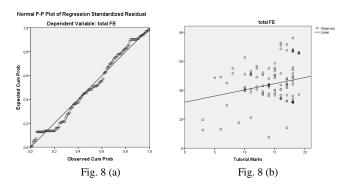
	Т	FE
	12.4	124
N	124	124
Mean	14.91	59.30
Median	16.00	56.25
Mode	18	50
Std. D	3.716	15.234
Variance	13.805	232.085
Minimum	3	16
Maximum	19	94



In Table 5 and Figure 7, we see that, mean and mode of tutorial marks 14.91 and 18. It means that most of the students get moderate marks and some students get high marks in their tutorial test. Again, the mean and mode of final exam marks 59.30 and 50. It means that most of the students get moderate marks and a few students get high marks in their final exam.

 $TABLE\;6 \\ CORRELATION \;R\; \text{and Coefficient of Determination } R^2 \; (T\;\&\; FE)$

R	R Square	Adjusted R Square	Std. Error of the Estimate
.227	.052	.044	13.646



From the information shown in Table 6 and Fig. 8, we see that, the correlation coefficient is (positive) less than 1 and the regression lines is increasing. It means that, in general, the students who get the higher scores in tutorial test then they also get the higher scores in final exam. Here, we regard tutorial marks as an independent variable and final exam marks as dependent variable.

V. COMMENTS ON THE WORK

In the above section, we discuss and analyze the scores of five questions, and T & FE marks in final exam of Engineering Mathematics subject, among the sample of 124 students from four different majors by correlation analysis based on SPSS software.

According to the sample data and statistical results, we see that:

Statement 1; Most of the students get the highest scores on both Q1(Limits and Continuity) & Q3(Integration) and lowest on Q4(Complex) & Q5(Vector Algebra).

Possible reasons are:

Compared with other questions, the nature of topics "Complex" and "Vector Algebra" are very complicated for the first year students and hence it is difficult to understand for some students. Next, it also depends on student's mastery of the knowledge and skills. There may be so many reasons.

Our comments are:

How should we modify both students and teachers in order to improve teaching and learning about such topics.

Statement 2;

(a) A few students get higher marks in both tutorial test and final exam. (Excellent Students)

(b) Some students get moderate marks in final exam even though they get higher marks in tutorial test. (Moderate Students)

(c) Most of the students get moderate marks in both tutorial test and final exam. (Moderate Students)

(d) Some students get lower marks in both tutorial test and final exam. (Poor Students)

Possible reasons are:

-due to student's mastery of knowledge and skills, -due to their hard working, -due to hard questions, and there may be so many reasons.

We provide the approach that how we should modify both students and teachers in order to improve teaching and learning for students who are required to take special classes and training.

VI. CONCLUSION

This article introduces the SPSS software into statistic analysis of examination scores for improvement of teaching and learning Mathematics. It provides a basis for teachers to specify new teaching programs scientifically and rationally in the future, and help improve the quality and level among University students.

ACKNOWLEDGEMENT

The authors would like to express their deepest gratitude to all persons who assist for this research work in any way.

References

- [1] Mathematical statistical model based on the effect of SPSS physical education, Yan Wang, XiaoxuanJia, Physical Education Department, Agricultural University of Hebei, China
- [2] The Statistical Analysis and Evaluation of Examination Results of Materials Research Methods Course, Wenjie Yuan, Chengji Deng, Hongxi Zhu, Jun Li, Wuhan University of Science and Technology, China
- [3] Coefficients of Determination, Jean-Marie Dufour, McGill University

Contact

Conference Secretariat Office Main Building(1/1-3), YTU, East Gyogone, Insein Township, Yangon, Myanmar Email

: icse@ytu.edu.mm, icseoffice@gmail.com

Tel

: +95-1-9663291

