Traditional Learning Problems of Computing Students

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Abstract—**This paper aims to report the traditional learning problems of computing courses students. To identify the problems a questionnaire was framed to focus on the problems and issues faced by students while interacting in a traditional learning environment. The study tested the respondent's attitude with five-point Likert Scale. The study was analyzed by using the NCSS program. Traditional learning problems were abridging by computing mean, median, mode, standard deviation and IRQ. This research highlights the problems of different computing courses particularly, problems of basic programming concepts, unable to write code, language barrier and confidence besides these, highlighted the various academic and non-academic problems. Reliability Analysis was achieved by Cronbach's Alpha and got encouraging results of an 80% reliability coefficient.**

Keywords—Traditional learning problems; computing education; statistical analysis of questionnaire

I. INTRODUCTION

Education is knowledge that process learning, skills, values, and enlightening experiences. The rapid growth of technology, and new trends in computer technology and annually more than thousands of students getting a degree in a computer science discipline. But, the lack of knowledge and confidence in understanding the content, of course, has created the problems and confusion for Graduate students. The author tries to overcome the gap of past to current [1]. All students are not in command to learn the basic hypothesis of programming even they do not learn basic concepts of a program [2]. For every field to check the learning outcomes of the learners in different courses, especially computing the assessments is the process of judging the students, which helps students to improve their abilities and skills. There is a need for time to introduce the process of smart learning methodology for basic program ideas to enhance their approach [3].

This study explored the traditional learning issues and difficulties for undergraduate computing students.

II. RELATED WORK

Education produces the resources, which leads to success for nations [4]. The educators try to deliver knowledge by their experiences, intelligence, style and mode of teaching. The advent of modern technologies and equipment has made education more and more easy, attractive and effective [5]. The smart devices with wireless connectivity to create ease and efficient education leads to a way of motivation and collective learning [6]. The learning is a continuous transformation process of obtaining the knowledge whether new or existing, behaviors and skills [7]. The learning is ability, whereas the skill and knowledge are acquired by the experiments and experiences. The transformation of new trends and technologies has a great impact on the learners, which helps them to enhance their ability and approach by the induction of smart devices [8]. There are many problems which are faced by the computing students when they are learning in a traditional environment. Most important problem is to increase the confidence level of students to create a perfect program, the proper practice is necessary for a student for the self-assessment to get good results [9, 10]. The students of the computer science discipline face failure to some extent. The Lack of interest in the importance of technology and course material [11]. The aim and objective of particular knowledge to examine the information or data and make a new solution, furthermore update the previous [12]. The traditional learning system works effectively but needs modification in theoretical and practical work which gives a path to learning methodology [13]. The author has reported that computer science courses and programming has been always a tough task, the results are discouraging for learners and educators respectively. The reason briefed by the author is the non-attractive traditional methods of learning. Furthermore, the author discussed the research and studies witnessed that encouraging results are achieved by incorporating the robotic and other visual environment techniques with the aim to build to deliver knowledge [14]. The prejudicial impact of computer games in our society regarding children idle time as quoted by the author. Later it was noticed that keen interest of children in computer gaming can be fruitful in creating motivation and driving force for learners to increase their interest. The author has developed a link between computer gaming and Software engineering ideas to bring innovative trends of teaching [15, 16]. The disappointing results of the student if DIT (Networking) regarding the simulation of practical work, there may be different reasons are non-achieving bright results. In order to dig- out the reason to improve and enhance the learning process by enforcing the theoretical to visual techniques. The author gives the idea of modifying and improving the laboratory environment with collaborative learning content of students to overcome the challenges faced by learners [17].

III. RESEARCH OBJECTIVES

The research study has two core objectives, which are

- To investigate the learning problems related to the traditional teaching methods in computing discipline with the help of designed questionnaire

- Data Analysis has been done with scoring matrices that provide the directions of traditional learning problems.

IV. PROPOSED METHODOLOGY

In order to achieve the objective of the research, a methodology with a number of steps has been designed as shown in Fig. 1; following steps are implemented as under.
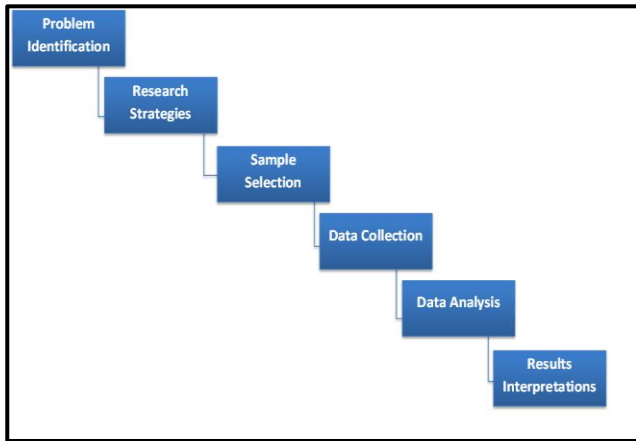

Fig. 1. Research Methodology.

- Problem Identification: This study aimed to extract the problems of the computing courses students in a traditional learning environment from the literature review as well as a pilot study.

- Research Strategies: In this step we analyze how to find out the problems of students, therefore, a questionnaire related to the problems of computing students in different subjects has been designed.

- Sampling: Final year students of the IT department are the subject of this study. The sample size of 28 has been used in this research who answered 33 questions.

- Data Collection: In this step, data has been collected using a questionnaire of 33 questions and collect the data in which students were asked to rate their problems with provided Likert scales of 5 points.

- Data Analysis: NCSS software has been used to analyze the data using descriptive statistics methods.

- Results Interpretations: Results have been interpreted using descriptive statistical analysis where central tendency mean, median, mode and standard deviation have been used. For the reliability analysis, Cronbach Alpha Coefficient method is used.

V. DATA DESCRIPTION

The samples for this study have been collected from final year students of Information Technology department from Quaid-e-Awam University of Science and Technology. The Questionnaire has been designed to identify the problems which have been faced by the undergraduate students in traditional learning, for Gathering and assembling of information and reporting the consequence's in a systematic and well-formatted manner.

The comprehensive detail of the data description is shown in Table I. The students were asked to rate each item on a provided scale from 1-5. The score obtained were ranked as follows:

1= strongly disagree 2= Disagree 3= undecided 4=agree 5= strongly agree.

A Likert scale is one of the main frequently used methods as a psychometric tool in educational and social sciences research. In this study, a Likert scale has been used. The "Respondents" are asked with choices to show their level of agreement (from strongly disagree to strongly agree). The Participants may have a choice of five to seven or even nine pre-coded responses along with an "undecided" point of neither agree nor disagree [18,19].

Fig. 2 elucidates that from the questionnaire responses it has been revealed mostly students show discomfort in learning the computing courses. Where the x-axis shows the number of questions and the y-axis shows student's responses.
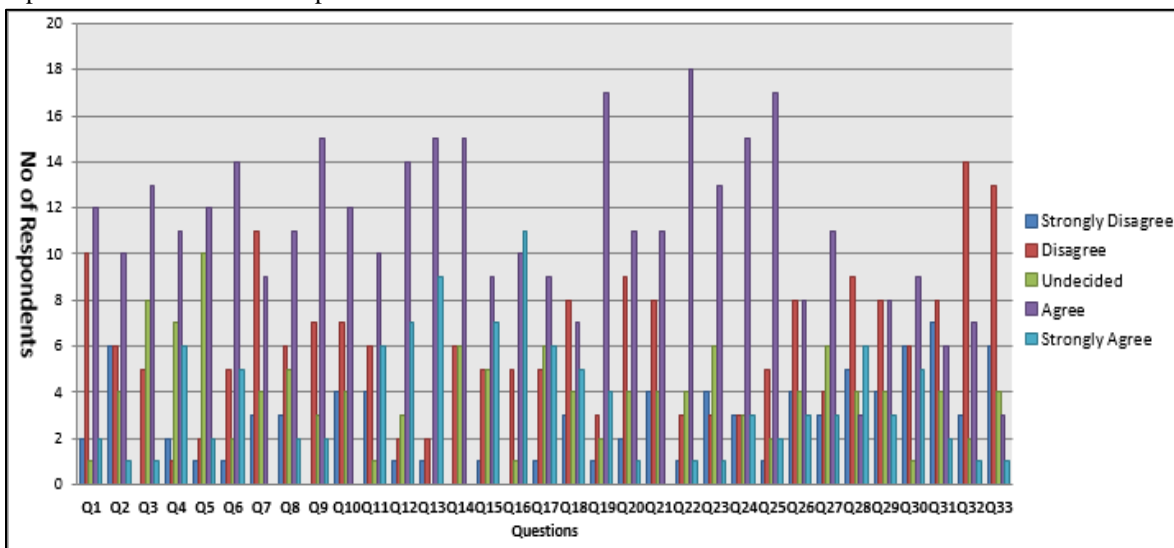

Fig. 2. Students Responses using Likert Scale.

TABLE. I.   DATA DESCRIPTION

No of Students	28
No of Questions	33
Likert Scale	1= Strongly Agree 2= Agree 3= Undecided 4= Disagree 5= Strongly Disagree

TABLE. II.   RESPONSES OF LIKERT

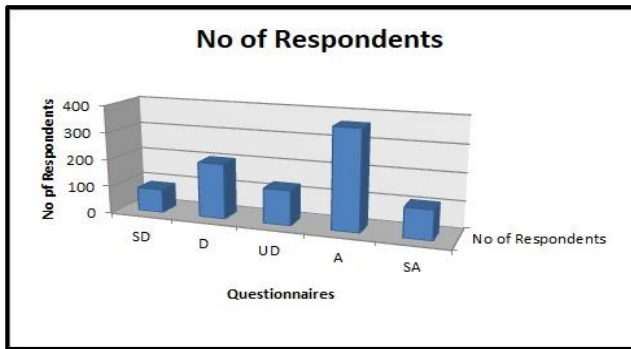| Questions options	No. of Responses	Percentages
SD	87	9.76%
D	203	22.78%
UD	128	14.36%
A	365	40.96%
SA	108	12.12%

Fig. 3.   Response of Questionnaire.

The data in Table II presents the responses and percentages of the students according to the Likert Scale.

This Fig. 3 presents the comparisons of responses which are provided by the respondents.

VI. DATA ANALYSIS AND EVALUATION OF THE RESULTS

For the analysis of the data, NCSS software has been used due to its high accuracy as reported [20-22]. The results of the summarized data that was collected and statistically analyzed accomplish the goal of this research study positively and reports the problems of computing students. The questions included in this study agreement with the results and justify different problems where the expectation of student performance affects and provide the answer to utilize different technologies to resolve these problems.

The data in Table III describes the detailed summary of statistics of 33 questions and all the analysis steps performed individually on every question.

A. Interpretation of the Results

The resulting Table IV summarizes the overall statistical analysis which has applied to the data and shows the result of IQR (Inter Quartile Range) which is a measure of dispersion and illustrates the scattered across the range responses. The IQR is a difference between the 75th and 25th percentile. It is mostly used to quantify scatter points. The percentiles are necessarily useful for normalized ranks. The small IQR (0-1) shows an indication of agreement about the opinion of a particular group while large IQR shows disagreements of the particular group regarding any opinion [24]. Table III shows the median value 4. The median is also called 50th percentile.

According to the statistical interpretations, the median is 4 and IQR from (0-1) means that most respondents show agreement about the particular statement. In our analysis, IQR is 1and the median is 4, therefore, we conclude that most of the students show the agreement regarding the problems highlighted in the questionnaire.

TABLE. III.   SUMMARY STATISTICS OF QUESTIONNAIRE

	Variables	Mean	Median	Mode(s) Count	SD	IQR
Summary Statistics	Q1	3.107143	4	4 (13)	1.196887	2
	Q2	2.785714	3	4 (10)	1.25778	2
	Q3	3.392857	4	4 (14)	0.831745	1
	Q4	3.678571	4	4 (12)	1.090483	1
	Q5	3.5	4	4(12)	0.922958	1
	Q6	3.62963	4	4 (14)	1.114525	1
	Q7	2.785714	2.5	2 (11)	1.133893	2
	Q8	3.142857	3.5	4 (12)	1.177388	2
	Q9	3.464286	4	4 (16)	0.961563	1.75
	Q10	2.892857	3	4 (12)	113331	2
	Q11	3.357143	4	4 (10)	1.445665	2.75
	Q12	3.892857	4	4 (15)	0.99403	0.75
	Q13	4.071429	4	4 (16)	0.978607	1
	Q14	3.537143	4	4 (16)	0.82616	1
	Q15	3.642857	4	4 (9)	1.193013	2
	Q16	3.92571	4	5 (11)	1.52407	0.75
	Q17	3.535714	4	4(10)	1.137969	1
	Q18	3.142857	3	2,4 (8)	1.325373	2
	Q19	3.678571	4	4(17)	1.020297	0.75
	Q20	3.035714	3	4(12)	1.104943	2
	Q21	2.857143	3	4(12)	1.1455	2
	Q22	3.535714	4	4(18)	0.881167	1
	Q23	3.178571	4	4(14)	1.156418	1.75
	Q24	3.5	4	4(15)	1.20185	1
	Q25	3.5	4	4(17)	1	1
	Q26	3.5	3	2,4 (8)	1.333333	2
	Q27	3.321429	4	4(11)	1.21879	1.75
	Q28	2.821429	2	2,4(8)	1.441542	2
	Q29	3.107143	3	2,4 (8)	1.333333	2
	Q30	2.607143	4	4(9)	1.523624	2
	Q31	2.678571	2	2(8)	1.314852	2.75
	Q32	2.357143	2	2(14)	1.188013	2
	Q33	2.357143	2	2(13)	1.161553	1

TABLE. IV.   SUMMARY STATISTICAL ANALYSIS

Overall Summary of Statistical Analysis	
Mean	3.2571749238416
Median	4
Mode	4
Standard Deviation	0.1677472183443
IRQ	1

B. Reliability Analysis

For the reliability analyses, Cronbach's Alpha method has been used to test and measure the reliability, or internal consistency, of a combined score. Cronbach's Alpha values can be obtained from the range 0 to 1, but you can get negative numbers as well. Sometimes one can get a negative number also which shows that there is something went wrong with the collected samples. The general rule of thumb regarding the reliability is that a Cronbach's Alpha of 0.70 and greater is good reliability, 0.80 and greater is better reliability, and excellent above 0.90 [23,24].

Table V interprets the comprehensive reliability report of this research study and showed the complete depiction of statistical functions applied to 33 questions.

TABLE. V.   RELIABILITY REPORT

Variable	Mean	Standard Deviation	Total Mean	Total Std. Dev.	Coef Alpha
Q1	3.074074	1.206582	103.4815	13.89624	0.8057
Q2	2.777778	1.281025	103.7778	14.42843	0.8230
Q3	3.37037	0.8388705	103.1852	14.03851	0.8063
Q4	3.666667	1.1094	102.8889	14.00915	0.8081
Q5	3.444444	0.8915558	103.1111	14.1131	0.8092
Q6	3.62963	1.114525	102.9259	13.69145	0.7977
Q7	2.703704	1.067521	103.8519	14.18749	0.8133
Q8	3.111111	1.187542	103.4444	13.49454	0.7917
Q9	3.444444	0.9740216	103.1111	13.86843	0.8021
Q10	2.888889	1.154701	103.6667	13.52491	0.7924
Q11	3.296296	1.436203	103.2593	13.67646	0.8017
Q12	3.888889	1.012739	102.6667	13.88968	0.8032
Q13	4.074074	0.9971469	102.4815	14.0312	0.8076
Q14	3.333333	0.8320503	103.2222	14.11855	0.8088
Q15	3.592593	1.184151	102.963	14.14616	0.8134
Q16	4	1.1094	102.5556	13.94587	0.8061
Q17	3.518518	1.155933	103.037	13.70705	0.7987
Q18	3.111111	1.339728	103.4444	13.60807	0.7979
Q19	3.740741	0.9842058	102.4818	13.8787	0.8025
Q20	3	1.1094	103.5556	13.76543	0.8001
Q21	2.814815	1.144789	103.7407	13.84694	0.8033
Q22	3.555555	0.8915558	103	13.69447	0.7953
Q23	3.148148	1.166972	103.4074	13.46294	0.7903
Q24	3.444444	1.187542	103.1111	13.46029	0.7905
Q25	3.5185518	1.014145	103.037	13.68458	0.7963
Q26	3.925926	1.298592	103.6296	13.31901	0.7870
Q27	3.259259	1.19591	103.2963	13.903	0.8058
Q28	2.851852	1.459813	103.7037	13.94168	0.8107
Q29	2.925926	1.298695	103.6296	14.02237	0.8110
Q30	3.037037	1.505924	103.5185	14.00651	0.8135
Q31	2.555556	1.310705	104	13.641	0.7986
Q32	2.592592	1.118352	103.963	13.84386	0.8029
Q33	2.259259	1.059484	104.2963	13.6292	0.7949
Total			106.5556	14.22439	0.8078

TABLE. VI.   RELIABILITY ANALYSIS

Reliability Analysis	
Cronbach's Alpha	**No of Items**
0.8078	33

Table VI shows the reliability analysis of Cronbach's Alpha that is 0.80 which means that it is better reliability about the opinion given by the particular groups regarding the problems reported in the questionnaire.

VII. CONCLUSIONS

The study was designed with an aim to predict possible problems of students while interacting with computing disciplines. For this purpose, the students of IT department of our university participated in data collection, 28 respondents' provide their responses. The provided responses were analyzed through NCSS software and achieve reliability by Cronbach's alpha and get encouraging results of 80% reliability coefficient and standard deviation of (σ) 0.16774. For showing the agreement regarding the opinion of the subjects is also validated using IQR and Median values. The overall findings of this research study have been enlightening the problems of traditional learning in computing subjects. An attempt has been made to fill the gap of learning barriers by addressing the problems which are faced by the students. There are numerous problems highlighted which adversely affected the student's level of confidence of learning outcomes and their achievements.

VIII. FUTURE RECOMMENDATIONS

In order to enhance and improve the learning of computer science subjects, with the help of a study conducted which highlighted the academic problems besides other issues. Keeping in view the problems of learners, a defined mechanism to be designed to improve the effective and efficient learning environment for a student with the utilization of dimensional encouragement of technologies and learning taxonomies.

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