

Role of Mathematics Instructors in Enhancing Student's Self-Confidence in Distance Learning During Coronavirus Disease

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Abstract

Background: This article aims to discuss and investigate forms of pedagogical knowledge of mathematics instructors and influence of their educational beliefs on their students during Coronavirus disease where progress in learning is typically influenced by self-confidence and anxiety.

Materials and Methods: A study survey was carried out to find out the extent of anxiety and self-efficiency students have before and during mathematics exams in distance learning.

Results: Out of 252 students, 88% are females and 12% are males, majority of students of the second level from different faculties filled the survey. The study reveals student's responses to the levels of the variables where confident is of 'always' attitude with mean 2.3714 (SD=.37764). On the other side, anxiety is of 'sometimes' attitude with mean 1.8595 (SD=0.4196). Those results are good and indicates that no big problems in mathematics either inside or outside university faced by sample we dealt with, this result refers to the simplicity and good characteristics of instructors of the university. Moreover, lots of programs that help in understanding basics and advanced mathematics.

Conclusion: Successful pedagogies instructors of mathematic used give the best explanation of results we have got in this study especially in distance learning. Detailed study plan that clarifies the course objectives, topics, evaluation method, books and resources must be given to students.

Key words: Mathematics learning, pedagogy, Self-confidence, Anxiety.

Introduction

Pedagogy is a Latin word that means the art, methods, strategies and procedures used in teaching. These methods or procedures include the targets of education which focus on creating an interactive environment between the teachers and their students. The procedures include many aims beside creating an interactive environment, exploring the ways that knowledge and skill grow and training instructors before starting teaching throughout educational programs by social and educational experts.^[1] In order to increase

the efficiency of learning process, monitor learning and fulfill targets of learning process, experts and novices must collaborate and strike horizons of conversation.

Scientific theoretical frameworks the shape of learning process and instructional decisions, hence pedagogy depends essentially on the scientific theories of learning that are considered as basis of how learning works, theories are behavioral, cognitive and constructivist. Many of those theories imply the roles of both of the learner and teachers. In addition, professional educators are guided by these theories.

Behavioral theories are inadequate, unsupported but no alternative explanation instead them where they are recently having a widespread acceptance. Typically, behavioral education must be done within a reasonable framework rather than within scientific human theories. We must focus on reasonable justification perspectives on individual's behaviors to enrich our reasoning and thinking of behavioral theories.

^[2]Decisions made by teachers are influenced by the strategies they acquired from their experience in teaching where they use many techniques such as activities, assignments, learning groups,..., etc. The importance of pedagogy comes from its ability to deal with events occur during teaching, thus without this terminology, teachers cannot explore, criticize, analyze and investigate the credence about the behavior of students, so the behaviorist pedagogical tactic focuses on teachers, so behaviorism is considered as a traditional teaching model.

It is primarily outcome-based, approaching defined and preordained subject matter and standardized basic skills that adult decision-makers (not learners) want teachers to transfer to learners, employing instructional models that include the use of conditioning through incentives, coercion, manipulation and other more forceful means used to achieve goals that were selected for the learner instead of by or with the learner. the theory of interaction describes learner's behaviors during the learning process where those behaviors can be imitated or repeated for many purposes. However, behavioral theories have an uneasy relationship with theories of learning. Using pedagogy depends on basic skills, instructional models, conditioning via incentives, coercion, manipulation, ... etc.

^[3] Constructive theories are acquired via experiences and thinking where it is based on projects, inquiries and brain storms. Piaget initiated 'schemas' based on the fact that learners are ready to learn, whereas teacher construct activities that simplify thoughts and ideas for learners. ^[11]For learners with little ages, learning must be done through physical activities, however older learners

outline symbolic and abstract ideas.

Contradicting constructivism that Piaget put some of its basics, social constructivism pedagogy considers learning as an interactive participatory process between students and teachers like group works, in addition it is considered as a mixture of two priorities: teacher is guiding learning process and student is under his concentration. Typically, interactive activities between teachers and students are vital methods for creating such a common context of experience within the school/university especially when teachers and the students are not of the same background.

For effective pedagogies, clear outcomes must be taken in consideration as necessity either long-term goals or short-term goals where depending lecturer's knowledge, beliefs, skills and behaviors is a priority.

Lots of learning strategies fit different situations instructors meet while teaching either online or in a class. Such strategies reinforce skills of instructors besides knowledge and behaviors of learners. In addition, they develop higher thinking proficiency, meta-cognition and improve dexterity of dialogue for both of instructors and learners. Embedding variety of ways of assessment helps in understanding what a learner needs exactly, but some instructors lack how to assess in a valid, reliable and efficient way. ^[12]We carried out a survey on our students to assess what are problems they have in dealing with mathematics. We analyzed results statistically and described it. Next section shows what we got and what are strategies we will take in consideration to come over our student's problems.

Our survey titled "Self-Confidence and Anxiety of mathematics in distance learning" is designed to measure the range of fear of mathematics especially before exams. The survey includes a sample of 252 students of Applied Science Private University in Amman, Jordan. ^[4]The students a survey includes are from different faculties and different levels where the levels are first, second, third...and seventh year. Each participant filled an online questionnaire including demographic information, information concerning their

ways to deal with mathematics in and outside university and how they prepare to mathematics exams. [5] For the validity and reliability of the results we have got, inductive and statistical analysis are used. Moreover, we calculated correlation coefficients between many items and determined their type and the strength of them.

2. Sample description

A sample of 252 students of Applied Science Private University were recruited to the study titled "Self-Confidence and Anxiety of mathematics in Coronavirus disease". Approximately 88% of them are females and the rest are males. We found that 90 students in their second year, that is 35.7% of the sample.

Table (1): demographic characteristics of the study sample

Academic Year	Frequency	Percent
First	57	22.6
second	90	35.7
Third	61	24.2
fourth	16	6.3
Fifth	17	6.7
Sixth	1	0.4
seventh	10	4.0

Gender	Frequency	Percent
Male	30	11.9
female	222	88.1

Study of items' means

The following part of our study reveals student's responses to the levels of the variables. Here, mean and standard deviation are calculated for each item, then they are ranked in descending order according to mean. Higher mean value indicates more agreement on that item.

A. Confident

Table (2): Mean, standard deviation and attitude for items of confident

Rank	Item No.	Item	Mean	SD	Attitude
1.5	3	I think I can complete all mathematics assignments.	3.0000	.00000	always
1.5	4	I think I'm a persons who knows mathematics.	3.0000	.00000	always
3	7	I hope that I know mathematics well	2.4167	.60952	always

Cont... Table (2): Mean, standard deviation and attitude for items of confident

4	11	I think I can solve mathematics problems in each subject	2.4127	.60896	always
5	5	I think I can understand contents of mathematics subjects	2.3254	.56214	sometimes
6	12	I feel confident when using mathematics outside the university	2.2738	.67425	sometimes
7	2	I think I can do well on a mathematics exams	2.2421	.56538	sometimes
8	9	I think I can solve mathematics problems	2.2341	.66556	sometimes
9	6	I think I can get an “A” in mathematics.	2.2183	.65897	sometimes
10	1	I feel confident enough to ask questions in mathematics lectures.	2.1984	.61870	sometimes
11	10	I feel I will be able to do well in mathematics subjects	2.1508	.64453	sometimes
12	8	I feel confident when taking a mathematics test	1.9841	.64350	sometimes
Confident Cronbach’s Alpha (0.883)			2.3714	.37764	always

From table 2, item 3 “ I think I can complete all mathematics assignments” and item 4” I think I’m a person who knows mathematics” have the highest mean value of 3(SD=0.000) with ‘always’ attitude.

In the second rank is item 7 “ I hope that I know mathematics “ with mean 2.4167 (SD=.60952) with ‘always’ attitude. Item 8 “ I feel confident when taking a mathematics test “ has the lowest mean with 1.9841 (SD=.64350) with ‘sometimes’ attitude. In general, confident is of ‘always’ attitude with mean 2.3714 (SD=.37764).

B. anxiety

Table (3): Mean, standard deviation and attitude for items of anxiety

Rank	Item No.	Item	Mean	SD	Attitude
1	1	I feel nervous when preparing for a mathematics test.	2.2262	.65018	sometimes
2	4	I am afraid I will not be able to get good grades in mathematics subjects	2.1667	.68274	sometimes
3	11	I am afraid I will not be able to get an “A” in mathematics	2.1508	.70363	sometimes
4	12	I’m afraid to answer incorrectly in a mathematics class	2.0000	.68565	sometimes
5	9	I’m afraid I won’t be able to complete mathematics assignments	1.9841	.68547	sometimes

Cont... Table (3): Mean, standard deviation and attitude for items of anxiety

6	7	Working on mathematics assignments bothers me	1.9603	.73502	sometimes
7	8	I am concerned that I do not know enough mathematics to be good in future	1.9167	.72312	sometimes
8	10	I fear I will not be able to understand mathematics	1.8492	.70363	sometimes
9	3	I am afraid I cannot use mathematics in my work in future	1.8333	.73338	sometimes
10	6	I feel nervous when asking questions in the lecture	1.7540	.69358	sometimes
11	2	I get nervous when I have to use mathematics outside of university	1.4722	.66442	Never
12	5	I feel nervous when listening to the math lecturer at the lecture	1.0000	.00000	Never
Anxiety Cronbach's Alpha (0.861)			1.8595	.41962	sometimes

From table 3, item 1 "I feel nervous when preparing for a math test" has the highest mean of 2.2262(SD= 0.650) with attitude of 'sometimes'. In the second rank is item 4 "I am afraid I will not be able to get good grades in math subjects" with mean 2.1667(SD=.6827) with attitude of 'sometimes'. The minimum mean is for item 5 "I feel nervous when listening to the math lecturer at the lecture" with only mean 1.000(SD=.0000) with attitude of 'never'. In general, anxiety is of 'sometimes' attitude with mean 1.8595(SD=0.4196).

Correlation analysis

Table (4): Pearson's correlation coefficients

Correlations		Confident	Anxiety
Confident	Pearson Correlation	1	-0.742
	Sig. (2-tailed)		0.000
Anxiety	Pearson Correlation	-0.742**	1
	Sig. (2-tailed)	0.000	

From table 4, the relationship between confidence and anxiety is strongly negative.

3. Tests and Analysis of variance

Are there significant differences in the levels of the study constructs that can be attributed to gender, class? Independent samples t-test will be used to test for gender while, analysis of variance (ANOVA) will be used to test for other personal variables.

1. Gender

Typically, an independent samples t-test was conducted to test that there are no differences in the levels of the study constructs that can be attributed to gender.

Table (5): Mean and standard deviation for males and females

Group Statistics	gender	N	Mean	Std. Deviation	Std. Error Mean
Confident	male	30	2.4250	.39231	.07162
	female	222	2.3641	.37594	.02523
Anxiety	male	30	1.7500	.37842	.06909
	female	222	1.8742	.42349	.02842

Table (6): Independent samples T tests

Variable	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						Lower	Upper
Confident	.828	250	.408	.06089	.07350	-.08388	.20565
Anxiety	-1.526	250	.128	-.12425	.08141	-.28458	.03609

Actually, from table 6, There are no significant differences between confident and anxiety that can be attributed to gender.

Recommendations

Provide a weekly summary containing a reminder of the assignments and tasks that are supposed to be achieved and delivered during the week, as well as lectures and topics that will be studied during it. Some applications and videos on a websites help students who feel shy or cannot ask freely during mathematics lectures to understand well because of their flexibility, availability

and simplicity. [6]Moreover, these application reinforce student’s self-confidence. Lots of cartoon films and games support axioms, theories and facts students learnt and contribute to the stability of information in their memory. Investing time has a vital in raising student’s awareness and responsibility and helps them to realize the need of every hour and minute, you can imagine the storm in his brain thinking what he must do to be better?

Typically, giving an immediate stimulating comment to the student's performance has a great effect on the student's self-confidence, provides students reassurance and creates a positive relationship between them and their instructors. [7] Comments might be written by messages, e-mails, audio, or through some applications. Definitely, rapid replies to students' inquiries and questions makes them feel trusted, not tense and comfortable. If we overcome socially accepted dominant ideas thought "I'm not good at mathematics", [9] we will enhance a student self-confidence and it will be a great job we ever done. Encourage each student especially those who feel that they can't do mathematics well to get rid of their fears.

For exams, [8] it is good to persuade student to practice some previous exams at home before their exams. Practicing gives them the ability to prioritize questions from easiest to hard ones, they also get used to the atmosphere of the exams, hence mitigating their fears of exams, pacing and knowing how exam looks like. Connections between ideas, theorems and axioms of mathematics with objects students use in their daily lives easiest thoughts stocking in a mindset, we can use expressions like "All Students Take Calculus" to illustrate in which quadrant a trigonometric function has a positive sign by relating the first letter of each word with a first letter of a trigonometric function. We tried to easiest the irrational number $\pi = 3.1415926$ by letting a student counts words of "May I Have a Great Container of Coffee". [10] This strategy leads us to emphasis on the importance of embedding games in teaching mathematics, the way that make mathematics fun and engage student's attention, like using a box filled with letter noodles and asking each student to draw number of those noodles and calculate probabilities of getting a certain letter or number of ways of getting letters of a word a student guess. We may use a die while talking about axioms of probability.

Finally, trying to make distance learning during Coronavirus useful via letting students imagine the world after Coronavirus disappearance and how can this affect their future plans.

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