Exploring the Effect of Problem Based Facilitatory Teaching Approach on Motivation to Learn in Nursing Education: A Quasi-Experimental Study of Nurse Students in Tanzania

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Abstract

Background: Currently, there has been a progressive shortage of not only the number of frontline healthcare providers but also a decline in the quality of nursing care. Reports about unethical and illegal practices, under standard care and malpractices are not uncommon around the globe. There is a growing concern to rethink the approaches on how nurses are prepared, explore, and test novel approaches for delivering the nursing curricula. This study tested the effect of Problem Based Facilitatory Teaching Approach on motivation to learn among nursing students in Tanzania, higher learning institutions.

Methods: A pre-post test controlled quasi-experimental study of purposively selected 401 participants was conducted between February and June 2018. The Auditing Inventory developed by the researcher measured FPBE and Questionnaire titled Motivation to Learn Strategies in Nursing was adopted to measure the motivation to learn, respectively. Statistical Product for Service Solutions software program version 23 was use to perform analysis. Descriptive analysis was performed to analyze sociodemographic. The t-tests were performed to determine mean score differences of the levels of motivation to learn between groups. Regression analysis was performed to determine the association between variables. This study was not a clinical randomized controlled trial and thus it has not been identified in the title and no summary of trial design, methods, results, and conclusion.

Results: Findings revealed that 65.8% of the study participants were males. The post-test results on Intrinsic motivation to learn indicated higher mean scores changes ($p<0.01$). Participants in an intervention group were 1.720 (AOR) times more likely to develop intrinsic motivation to learn than the control group ($p<0.05$). Moreover, FPBE was less times likely to enhance Extrinsic motivation to learn (AOR = 0.676, $p>0.05$) and Amotivation (AOR = 0.538, $p>0.05$) in learning among nurse students respectively respectively.

Conclusion: FPBE had a positive effect on the intrinsic motivation to learn than conventional teaching pedagogy. Thus, FPBE has the potential to positively change the spectrum of nursing competency and quality of care. Recommendations were given based on the findings.

Background

Globally there is a critical shortage of nurses despite increasing health needs and demands for an expanded role of the nursing profession in the delivery of complete health care (1). Additionally, as of 2006 World Health Organization (WHO) report, it was estimated that countries with fewer than 23 physicians, nurses and midwives per 10 000 inhabitants fail to achieve adequate coverage of quality and cost-effective health care services to the people (2). Nursing represents the glue that holds the patient's experience with the health care system. Across the entire spectrum of care needs and patient role experiences, there is a high demand for competent professional care and support from the Nurses.

Currently, nursing professionals make almost 50% of the health workforce worldwide. Of the 43.5 million Healthcare Workers, 20.7 million (50%) are nurses and midwives. Global projection of the shortage of nurses and midwives by 2030 is in a moderate decline by 7.6 million for the developed countries whereas trends show a worsening situation for the African and Eastern Mediterranean regions if the current trend continues (3). According to the human resource for health strategic plan 2008–2013 report by Ministry of Health and Social well-fare (4), the shortage for nurses in Tanzania ranged from 65% in public health facilities and 86% in private health facilities indicating that Tanzania's health system faces a shortage of nurses, which requires urgent measures.

On the other hand, increased burden of new diseases, increased population aged over 60 years old, advances in science and technology, increased patient autonomy and demands for quality and affordable care; all call for a new thinking towards nursing as a profession, its body of knowledge, learning pedagogy and scope of practice (3,5,6). Corresponding to the complexity of the nursing body of knowledge and the expanding roles that graduate nurses are expected to carry, today the nursing curriculum is highly loaded with both robust content and rich practical experiences (7). The curriculum is lined up to ensure that nursing graduates are highly motivated to learn for them to have higher levels in cognition, critical thinking becomes real-world problem solvers (8,9).

Recent changes in nursing education, have led to the desire to provide meaningful teaching and learning, which motivate students to learn on their own with minimal full support from instructors. Motivation to learn is a measure of quality assurance towards competence which indicates that professional nurses are being prepared to carry out nursing practices in solving real-world problems in rapidly changing environments (10).

Motivation holds a biological, social, cognitive, and emotional feeling of enthusiasm, interest, or commitment, which makes an individual student want to continue to perform well in studies. It is classified as intrinsic motivation to know, intrinsic motivation toward accomplishment, intrinsic motivation (to experience motivation), extrinsic motivation (Identified), extrinsic motivation (Introjected), extrinsic motivation (External regulation), and Amotivation. The measurement of motivation to learn this continues to be a critical issue in the nursing education grounds (11).

Carroll (12) described the academic motivation and academic achievements to be two significant factors in the analysis of academic performance for students. It refers to student's inner desire that guides behavior towards learning and academic achievements influenced by both, internal and external factors. Motivation plays a major role in explaining behaviors, predicting the effects of actions and guiding behavior to achieve objectives. It does not only promote learning but also in an intermediate to learning which helps students to have smooth relationships, decrease

stress, increase creativity and promote open learning (13). Various scholars, refer an academic motivation to as the required stimulation to do the assignments, to achieve the goals or to acquire a certain degree of competence in one's work and consequently gain academic achievements (14–16). It is a key factor in a student's academic performance in a problem-based environment. It can be classified as intrinsic motivation (to know), intrinsic motivation (toward accomplishment), intrinsic motivation (to experience motivation), extrinsic motivation (Identified), extrinsic motivation (Introjected), extrinsic motivation (External regulation), and Amotivation.

Motivating nurse students to learn while they are at school has been observed to bring hope in producing graduates who will be able to address societal health needs and create contemporary society's awareness of the current educational systems, management of nursing education systems, and blend well with the advanced science and technology (17). It is an essential component to ensure competent graduates who can exhibit safe, ethical and legal practice and is a critical issue in the nursing education grounds (14,16,18). Duiker (10) found out student's motivation in education is often driven by two questions "Can I do this task?"(Beliefs on one's capabilities, belief about factors which cause success and belief about one's low influence on success) moreover, "Why am I doing this task?" (Task values-interestingness, importance, utility, goal orientation).

Gattinger (15) embraces that, the choice and volition regulate students with autonomous motivation. Autonomously motivated students to study in a self-empowered or self-directed manner. Intrinsic motivation is the highest level of autonomous motivation. Students with intrinsic motivation study because studying in itself is enjoyable or interesting. However, also more identified forms of extrinsic motivation are considered to be autonomous (20).

These students will have an extrinsic reason for studying, but that reason integrates with their fundamental goals and needs. For example, a psychology student may voluntarily choose to invest effort in a statistics course, even if s/he does not find this enjoyable because this course will help him or her achieve a major life goal: becoming a psychologist (21). In other words, tasks that are interesting or relevant can elicit autonomous motivation. Regarding goal orientations, the assumption is that autonomous motivation has close links with mastery goal orientation.

Researchers describe controlled motivation, on the other hand, is regulated by internal or external pressure. Students with introjected motivation run by internal pressures such as shame or guilt. Students with external motivation are keeping pace by external contingencies, such as demands of others, the threat of punishment, or extrinsic rewards. The concept of introjected motivation closely aligns with having a performance goal orientation, whereas the idea of extrinsic motivation is assumed to have positive associations with instrumental motivation/high utility value in an FPBL environment (14,22,23). In addition to autonomous and controlled motivation, motivation is distinguished. Amotivation is written off as the relative absence of motivation. It is a state in which students lack an intention to act and a sense of personal causation. Amotivation can occur when the task or activity is not valued when students do not feel competent to do a task, or when they believe acting will not lead to the desired outcome (17).

The curricula in nursing institutions are challenged to motivate nursing students to acquire appropriate skills that will allow them to offer high-quality care to patients/clients (11). Challenges are still on enhancing student's intrinsic motivation (to know), intrinsic motivation (toward accomplishment), and intrinsic motivation (to experience motivation) rather than extrinsic motivation (Identified), extrinsic motivation (Introjected), extrinsic motivation (External regulation) and decrease Amotivation. A lack of motivation for nurses will not only burn them but may also have destructive effects on the health of society and result in a waste of time and money. It is inevitable however for faculty members, managers and consultants to take a look at employing FPBE teaching pedagogy in nursing programs in order to enhance motivation to nursing students.

A global strategic direction 2016–2020 is to strengthen nursing and midwifery education. It has begun involving various stakeholders (expertise) and empowering educational system organs. They include academicians, policy-makers, government chief nursing, and midwifery officers, professional associations, educational institutions, individual nurses and midwives, non-governmental organizations, students and civil society to solve the noted education discrepancies (24). The emphasis also has been on the adoption and utilization of competency-based curricula in various educational systems.

Tanzania is among Sub-Saharan African countries, which has adopted competency-based curricula. However, no evidence shows how Health Science Colleges/Universities have changed to cater to new demands (4) However, no matter what happens, educators continue being challenged to motivate and prepare students for the future they cannot predict, and if they do not prepare them to be life-longer learners, they are doing them as dependent nurse professionals. Tutors and lecturers, still focus on developing course contents along with traditional instructional-based pedagogies with the hope that, learners will be motivated and develop the intended knowledge and skills automatically (25).

Educators find themselves utilize instructional teaching methods (traditional) more often because it is cheap, easy to implement, can cover an extensive course content at once and suitable for a large group of students (17). Professional schools subsequently are still having a difficult time in assisting their students to be motivated to learn in program modules (14). Likewise, students are trained in such a way they associate teaching and learning as the process, which involves preparing for a test or earning a grade (26). However, competency-based curricula aligned with facilitation in the problem-based environment (FPBE), has been seen to be a robust educational solution (27). PBL is a teaching pedagogy that

uses real-world problems as the motivator of student's self-directed learning process and makes students break the culture of academic silence within the classroom and outside the classroom (28).

Problem-based learning (PBL) pedagogy is rooting in a constructivist instructional approach (learner-centered). It began in the early 1760s at the medical schools at McMaster University in Canada whereby in the 1970s, the University of New Mexico with support from McMaster set a program and showed effectively working for students to be lifelong learners (29). Its aims were to motivate and help students construct an extensive and flexible knowledge base, develop effective problem-solving skills, become an effective collaborator, develop competences in their learning process.

Its emphasis is on academic motivation and knowledge construction rather than knowledge transmission. It motivates and makes students be a source of knowledge and skills. It advocates the philosophical and psychological concepts which assets students not taken like a blank slate (tabula rasa). They can build up new knowledge from their existing one (zonal of proximal development) while scaffolding being the support to help them achieve their significant developmental potentials (30).

Students in the problem-based environment demonstrate more enthusiasm and interest in the subject matter. It was seen to be a useful instructional alternative to conventional teaching pedagogy as many medical education students, could not see the relevance of first-year course materials like Anatomy and physiology to their future profession (32). Under FPBE pedagogy, the delivery of teaching materials is done by projecting questions or problems and let students discover the solutions on their own which are then the entire class (20).

Students are given opportunities to explore, investigate, analyze, synthesize, and carry out experiments and eventually reach their conclusions. The instructor's roles are just to facilitate, direct, guide, and assist students to be motivated to learn. The instructor poses questions to the entire class and students in teams work together to discuss and reach an agreement on their answers, which then they share in the class (19,33). The teaching and learning environments are set to favor the implementation of facilitation in the problem-based environment. Its assessment process was through an observational checklist or scoring rubric according to the educational psychology, and philosophical criteria set out by the teacher, peer scoring, self-evaluation, portfolios, and critical incidents or anecdotal (34).

In the face of pons from the use of PBL pedagogy in delivering course content among students, it is argued that instructors are hesitant to try this method, as it requires additional planning. They often feel as if they are diminishing their professional reputation. They see themselves not doing their job especially when students are working together and actively discussing the materials instead of busily taking notes (35,36). They find themselves switch into lecture-based instructional pedagogies, as they are always ready-made and prescribed by the state or professional bodies and they need no extra preparation before teaching (37).

What is lacking; is understanding to what extent can new teaching methods like FPBE pedagogy be an alternative and effective teaching pedagogy in improving learning motivation to nursing students in solving real-world problems, (27). Available findings do not adequately show clearly whether course instructors are actively implementing facilitation in problem-based environment pedagogy as a means to motivate students to learn. There is a scarcity of locally nursing scholarly literature, on the subject in Tanzania. Likewise, little has been done to demonstrate the means through which Tanzanian nursing training institutions are actively implementing new instruction pedagogies (4).

The current study aimed at determining the effect of FPBE teaching pedagogy on motivation to learn among undergraduate nurse students in higher Tanzanian training institutions. It was guided by specific objectives including determining the effect of FPBE pedagogy on the level of intrinsic motivation, extrinsic motivation, and Amotivation to learn among undergraduate nurse students in higher learning institutions within Dodoma city. The null hypothesis was used to determine the effect of the independent variable over the outcome variable, which stated: "there was no significant difference in the levels of motivation to learn between nurse students under FPBE and their counterparts in the NFPBE in a higher learning institution, Tanzania."

Methods

Study Design and Approach

The study was a pre-post test quasi-experimental with a controlled study of random allocated learning institutions (to either be in an intervention or control group) through a simple random sampling technique by lottery method, which was done by the research assistants. The researcher blinded the study participants and research assistants about their allocation to either the intervention or the control group prior to the study. Pieces of paper labeled "institution one and institution two", were then folded into a box and shacked by the research assistant. Then the first pick of papers after opening it was assigned to an intervention and the second to the control group. The study participants were purposively selected 401(interventional group = 134 and control group = 267) by the researcher and research assistants.

The participants were undergraduate nurse students from selected government and private-owned higher learning institutions in Tanzania. This population was among the greatest expected workforce in the nursing profession who could work in various health facilities to render health service among people. If they would graduate competently under proper and excellent academic preparation, it would help to improve the quality

of health services to the society at a low cost. The quantitative research approach was employed to determine the extent FBPE could improve levels of motivation to learn among nurse students.

The study included undergraduate nurse students, who were admitted and registered directly from higher education and stay in/out the campus in the respective Universities as per the semester schedule. Moreover, nurse students, who were not repeating the year of studies or transferred in from other Universities or upgrading, students who had a regular attendance of classes and those who gave a written informed consent (willingness to join the study) prior to the commencement of the study. Matching of the study participants by their social demographic and academic characteristics was also done to ensure the similarities.

The sample size was determined by using findings of Shahin *et al.*, (38), who did a study on the critical thinking and self-directed learning as an outcome of facilitation in a problem-based environment among nurse students. The study found that there was a statistically significant difference in mean scores for SD 16.44 in an intervention group (A) and SD 14.45 in the control group (B). A WinPepi Software program (sample size calculator) version 11.65 was used to calculate the minimum sample of this study. Effect size ($d = 4.5$) of demonstrating a statistically significant difference between mean values of the before and after the intervention, was set at a 95% confidence interval. A significance level was set at 5% ($p < 0.05$) with the power of 80%. The ratio of sample size was B: A = 1:2.

Study Location

The study was done between February and June 2018 in the two major Universities within Dodoma administrative region and currently the Capital city, Central zone of Tanzania. The pre-post written test was used to collect and compare data before and after an intervention. The interventional group learned the prepared research content by using FPBE pedagogy whereas their counterpart (control group) learned by using the conventional-based instructional method.

Data Collection Process

No kind of harm (be physical, emotional, social, spiritual, cultural or economic) occurred to the study participants throughout the study. Before the commencement of data collection, written informed consents were obtained from the study respondents that helped the research to be assured about their willingness to participate in this study. To ensure privacy and confidentiality, all the study participants gathered in a room that was offered by the deans of the respective learning institution and given brief instructions on how to fill the questionnaires. Then, the researcher and research assistants distributed copies of questionnaires among the study participants and supervise the process of filling them throughout data collection. All participants answered the same questions before and after an intervention. Any point that needed clarifications, the researcher or assistants responded accordingly. Anonymity was ensured by excluding the study participants' names from the data collection instruments.

Data Collection Tools

The instrument used for data collection was a structured Questionnaire titled Academic Motivation Scale (AMS-HS 28): adapted from AMS – College Version 1993 and validated by Haugan *et al.*, (39). The tool was used for assessing levels of intrinsic motivation (towards knowledge, accomplishments, and stimulation), extrinsic (introjected and identified regulation), and amotivation among undergraduate nurse students. It had 28 items with 140 scores on a 5-point point Likert scale. Scale 1 = does not correspond at all, 2 = correspond a little, 3 = corresponds moderately, 4 = corresponds a lot and 5 = corresponds exactly. Part A of the instrument elicited information about demographic data (e.g. age, sex, education level of the student, accommodation status, etc.). Part B elicited information about levels of motivation to learn adopted by students in their learning processes. This part covered three aspects (Intrinsic motivation, extrinsic motivation, and Amotivation to learn).

Intrinsic motivation was assessed by using a twelve (12) 5-point Likert (≥ 6 scores were defined as intrinsically motivated) scale items, extrinsic motivation twelve (12) items (≥ 6 scores were defined as extrinsically motivated), and Amotivation to learn 4 items (≥ 2 scores were defined as intrinsically motivated). The overall motivation to learn among the study participants was then computed that had a cut-off point in this study was set at 70 scores from 140 total scores of the scale items. The study participant, who scored ≥ 70 of the scale items, was defined as motivated to learn otherwise not.

Development and Classroom Tryouts of the Research Teaching Guidelines

Auditing inventory (AI), developed by the researcher, was used to collect experts' and students' opinions of the developed research teaching materials after each classroom tryouts before the actual field testing. The developed material was tried out in the classroom for three phases (phases 0, 1, and 2) (40). Phase 0 was the development phase while phases 1 and 2 were for classroom tryouts. The third version was subjected to the field-testing. Classroom tryouts for phases 1 and 2 were done in one sampled health training institution, which was different from health training institutions where the study was conducted. All classroom tryouts involved 10 nurse students, researcher, 2 research assistants, 1 curriculum development expert, 1 over five years experienced nurse tutor in teaching leadership and management content.

Experts and student's opinions of one classroom tryout led to the development and refinement of the next version. Auditing inventory covered a number of aspects including the relevance of the content, content organization, organization of learning experiences, timing, dosage, frequency, and evaluation strategies. The topics were drawn from the Leadership and Management course, which was found within the undergraduate

curriculum for Bachelor Degrees in Nursing Program. The researcher developed the ill-structured scenario on conflict resolution strategies at a working area with assistance from the curriculum development expert and nurse tutor who had over 5 years of teaching experience in nursing courses.

The evaluation process of the developed research teaching material was done formative and summative basing on the experts' and students' opinions. All observations from experts and students were only used to assure the acceptability, feasibility, and practicality of the research teaching and learning material before actual field implementation.

Validation and Reliability of the Research Instruments

All research tools were shared with experts and senior colleagues for their review, inputs, and opinions to ascertain their validity before classroom tryouts (done in phase 0). Modifications were effected to ensure that only the recommended content and items were administered among the study participants.

Facilitation in a Problem-Based Environment Sessions (Intervention)

This part served as an actual implementation phase, which involved the followings;

Introduction and Group Formulation

this part was covered in the first day of the study for introducing the FPBE and familiarizes students with the researcher and research assistants. The researcher introduced the FPBE process and shared the expected terminal behavior throughout the FPBE classes. Students were then randomly assigned to the learning groups (8 students) per each whereby they were asked to appoint a leader and record keeper between himself and herself. This part took approximately 30 minutes.

Problem Presentation, Solving, and Discussions

the researcher and research assistant before its commencement to avoid groups going off track reviewed objective of each session. Each group was asked to seat in the round so that they could maintain eye contact and facilitate the easy flow of discussions. Thereafter, each group was given the developed scenario on Conflict Resolution at the working place and allows the students to start addressing it. Participants were guided and facilitated by the researcher and research assistants to solve the problem, listing what they knew, what they did not know, what they needed to know and establish the issues to learn.

Students were guided to clarify, rank, and assign learning tasks to each member of the group. They were then guided to identify and suggest the reasoned available resources needed to solve the presented problem and continue solving it. This part took approximately 60 to 120 minutes based on the institution schedules. Then, students were given one week to address the problem until the next scheduled time because there would always-learning issues to be explored about the problem. As part of the closure, the researcher and research assistants required either students to communicate by mobile texts, orally or writings through email whenever they need any help or clarifications. In the next meeting, presentations of the solved problems were done per each followed by discussions and sharing of real-world scenarios, which reflected their experiences in real life. Misconceptions and other myths got a chance to be cleared and participants have to gain new knowledge and skills about how to address conflict in working areas once they occur.

Group Facilitations

this study used two forms of facilitating the groups including researcher and research assistant facilitation and group leaders' facilitation. Group leaders were sometimes used to facilitate groups because the classes were so large. They were briefly instructed to act as facilitators on how to monitor and control the learning process in their groups. They were given the roles of moving from one group to another, ask probing questions, and give encouraging words, which in turn could help to serve students who would nearly drop or withdraw from the study.

Assessments

after completing the FPBE classroom sessions, the researcher, assistant researchers and students, evaluated the lesson objectives by providing inputs, students learning behaviors, advantages and disadvantages of group interactions and the benefits of learning through FPBE. Peer assessment was the main method used to assess the learning process among participants. The posttest to assess end line levels of motivation to learn was then administered to the participated students to ascertain the effect of FPBE.

Data Analysis

Descriptive and Inferential statistical analyses were performed in this study. All the statistical analysis was performed using the Statistical Product for Service Solutions (SPSS) version 23. The study findings were presented in tables. Descriptive statistics by the means of chi-square and cross-tabulation statistical tests were performed to determine the relationship between categorical variables and findings were presented in frequencies,

percentages, mean scores, and standard deviation (SD). Paired-sample and independent samples t-tests were performed to compare the mean scores differences among the study participants within and between groups whereby to mean (M), standard deviation (SD) and p-value were used to present the findings in tables. Inferential statistical analyses were performed through regression analysis to determine the association between variables. The findings were presented in tables by odds ratio (OR), adjusted odds ratio (AOR), p-value that was set at ≤ 0.05 to be statistically significant at 95% confidence interval (CI).

Results

Demographic characteristics of the study participants

Table 1 shows the distributions of the study participants' gender, age, marital status, and accommodation status. It was observed that 65.8% of the participants were males and 34.2% females.. 73.6% of the participants have age ranging between 25 to 29 years and it was a dominating age group in this study. In addition to that, 92.5% of them were singles against those who were married. 69.3% of the participants lived on campus. No statistically significant difference in their gender, age, and marital status distributions between groups ($p > 0.05$). A significant difference was observed in the accommodation status of the participants between the two groups ($p < 0.01$).

Table 1
Distribution of participants 'characteristics between FPBE and NFPBE group (n = 401)

VARIABLE	FPBE		NFPBE		P-value
Gender	N	%	N	%	0.244
Males	83	61.9	181	67.8	
Females	51	38.1	86	32.2	
Age	6	4.5	25	9.4	0.192
< 24 yrs.	100	74.6	195	73.0	
25–29 yrs.	28	20.9	47	17.6	
> 30 yrs.					
Marital status	123	91.8	248	92.9	0.695
Single	11	8.2	19	7.1	
Married					
In campus	43	32.1	235	88.0	0.001
Yes	91	67.9	32	12.0	
No					
Source: Field Data (2019)					

Other important participants' characteristics (interest, reasons, satisfaction, learning benefits, and learning difficulties), which could influence motivation to learn (n = 401)

As shown in Table 2, 73.8% of the participants were interested in the nursing profession and its programs while 52.4% of them had chosen the nursing profession, as their first "own choice" and 20.9% due to parent's/peer pressure. Moreover, 75.3% of the participants were satisfied with nursing courses being taught to them whereas, 84.0% of them agreed that the teaching and learning practices were of a benefit to their learning processes. However, 30.7% of the participants reported experiencing some difficulties in comprehending course contents due to its complexity, limited time (25.9%) and difficulties in accessing learning materials (20.0%). Some findings differed between groups as it is shown in the table.

Table 2
Distributions of participants' factors between FPBE and NFPBE group

VARIABLE	FPBE		NFPBE		Chi-square test		
	N	**%**	**N**	**%**	**Value**	**df**	**P-value**
Interest	92	68.7	204	76.4	2.771[a]	1	0.096
Yes							
No	42	31.3	63	23.6			
Reasons to choose nurse	71	53.0	139	52.1			
Own choice	29	21.6	55	20.6	0.430[a]	3	0.934
Parent's/peer pressure	24	17.9	48	18.0			
Easier to get a job	10	7.5	25	9.4			
Entry qualifications							
Satisfaction	78	58.2	224	83.9			
Yes	56	41.8	43	16.1	31.60[a]	1	0.001
No							
Learning benefits	104	77.6	233	87.3	6.200[a]		
Agreed	30	22.4	34	12.7	6.200[a]	1	0.013
Disagreed							
Learning difficulties	24	17.9	56	21.0			
Difficult accessing updated learning materials	49	36.6	74	27.7	9.665[a]	4	0.046
Complex course contents	18	13.4	37	13.9			
Inadequate support from lecturers	25	18.7	79	29.6			
Limited time	18	13.4	21	7.9			
No conducive environment							
Source: Field Data (2019)							

Baseline versus post-intervention learning motivation, among undergraduate nurse students at Higher Training Institutions, Tanzania (n = 401)

Intrinsic motivation (Knowing what to learn)

Table 3 below, shows the baseline intrinsic learning motivation (IM) scores in the aspect of knowledge among the participants in an interventional group to have no statistically significant difference with that of the participants in the control group. (n = 134, M = 55.30, SD = 12.68) and (n = 267, M = 52.70, SD = 13.30) respectively, t (399) = 1.876, p > 0.05; CI: -0.125, 5.325).

However, participants' mean scores between the two groups differed significantly whereby participants in an intervention group scored high (n = 134, M = 63.52, SD = 17.45) than participants in the control group (n = 267, M = 58.77, SD = 16.42), t (339) = 2.674, p < 0.01; CI: 1.257, 8.239) (Table 3).

Intrinsic motivation (Accomplishment of learning tasks)

Intrinsic motivation mean scores under the aspect of accomplishment of learning tasks showed no statistical significant differences between the two groups at baseline. Participants in an interventional group scored nearly the same (n = 134, M = 53.95, SD = 12.70) as participants in the control group (n = 267, M = 51.32, SD = 13.11), t (399) = 1.911, p > 0.05; CI: -0.075, 5.326). The post-intervention mean scores demonstrated significant difference among participants in an intervention group who scored higher (n = 134, M = 62.67, SD = 14.14) than participants in the control group (n = 267, M = 57.75), t (399) = 2.907, p < 0.01; CI: 1.593, 8.246) (Table 3).

Intrinsic motivation (Experiencing Stimulation to Learn)

The baseline findings of the intrinsic motivation scores under the aspect of experiencing stimulation in learning processes indicated no statistical significant mean score differences between participants in an interventional group (n = 134, M = 50.36, SD = 16.72) and participants in the control group (n = 267, M = 53.40, SD = 13.63), t (399) = -1.949, p > 0.05; CI: -6.104, 0.027). Nevertheless, the post-intervention scores showed higher mean

scores among participants in an intervention group (n = 134, M = 71.49, SD = 17.33) than participants in the control group (n = 267, M = 67.21, SD = 15.21), t (399) = 2.535, p < 0.05; CI: 0.960, 7.600) (Table 3).

Extrinsic learning motivation (Identification of what to Learn)

Findings in this aspect showed no baseline significant difference among participants in an interventional group (n = 134, M = 54.81, SD = 16.49) and participants in the control group (n = 267, M = 57.89, SD = 14.48), t (399) = -1.918, p > 0.05; CI: -6.240, 0.078). However, after an intervention participants in an intervention group scored higher (n = 267, M = 72.57, SD = 17.29) than participants in the control group (n = 134, M = 67.98, SD = 17.80), t (399) = 2.486, p < 0.05; CI: 8.229, -0.961) (Table 3).

Extrinsic learning motivation (Introjection to Learn)

The baseline introjection extrinsic motivation mean scores were not statistical significantly difference between participants in an interventional group (n = 134, M = 57.50, SD = 41.90) and participants in the control group (n = 267, M = 52.45, SD = 14.99), t (399) = 1.757, p > 0.05; CI: -0.600, 10.685). However, participants in the control group scored higher after an intervention (n = 267, M = 72.10, SD = 17.53) than participants in the intervention group (n = 134, M = 67.68, SD = 18.59), t (399) = 2.329, p < 0.05; CI: -8.136, 0.688) (Table 3).

Extrinsic learning motivation (Regulation of Motivation to Learn)

Likewise, there was no observed statistical significant difference in baseline mean scores between the participants in an intervention group (n = 134, M = 54.93, SD = 13.40) and participants in the control group (n = 267, M = 57.70, SD = 14.07), t (399) = -1.904, p > 0.05; CI: -5.633, 0.091). After an intervention, participants in the control group scored higher (n = 267, M = 66.55, SD = 16.27) than participants in an intervention group (n = 134, M = 62.53, SD = 14.49), t (399) = -2.422, p < 0.05; CI: -7.292, -0.757 (Table 3).

Amotivation to Learn

The study findings in Table 3 correspondingly showed not statistical significant baseline amotivation scores among participants in an interventional group (n = 134, M = 53.98, SD = 11.40) and participants in the control group (n = 267, M = 56.30, SD = 11.99), t (399) = -1.854, p > 0.05; CI: -4.770, 0.140). Statistical significant difference was observed after an intervention in which participants in an intervention group scored low (n = 134, M = 58.99, SD = 8.49) than participants in the control group (n = 267, M = 62.56, SD = 16.74), t (399) = -2.322, p < 0.05; CI: -6.90, -0.547).

Table 3
Baseline Intrinsic Motivation to Know (IMK), Intrinsic Motivation towards Accomplishment (IMC), Intrinsic Motivation to experience Stimulation (IMS), Extrinsic Motivation (EM) Identified (EMI), Extrinsic Motivation Introjected (ETIT), Extrinsic Motivation external Regulation (ETR) and Amotivation (AM) mean scores, among undergraduate nurses between FPBE and NFPBE group (n = 401)

PRE-INTERVENTION								POST-INTERVENTION						
Variables	FPBE		NFPBE		Independent t-test			FPBE		NFPBE		Independent t-test		
	X	SD	X	SD	P-value	95% CI		X	SD	X	SD	P-value	95% CI	
						Upper	Lower						Upper	Lower
IM - to know	55.30	12.68	52.70	13.30	0.061	-0.125	5.325	63.52	17.45	58.77	16.42	0.008	1.257	8.239
IM – accompt.	53.95	12.70	51.32	13.11	0.057	-0.075	5.326	62.67	14.14	57.75	16.83	0.004	1.593	8.246
IM – stimuli.	50.36	16.72	53.40	13.63	0.052	-6.104	0.027	71.49	17.33	67.21	15.21	0.012	0.960	7.600
EM – Ident.	54.81	16.49	57.89	14.48	0.056	-6.240	0.078	67.98	17.80	72.57	17.29	0.013	-8.229	-0.961
EM – Introj.	57.50	41.90	52.45	14.99	0.080	-0.600	10.685	67.68	18.59	72.10	17.53	0.020	-8.136	-0.688
EM – regul.	54.93	13.40	57.70	14.07	0.058	-5.633	0.091	62.53	14.49	66.55	16.27	0.016	-7.292	-0.757
Amotivation	53.98	11.40	56.30	11.99	0.064	-4.770	0.140	58.99	8.49	62.56	16.74	0.021	-6.590	-0.547

Source: Field Data (2019)

Factors related to and the effect of FPBE on intrinsic motivation, among undergraduate nurse students between FPBE and NFPBE groups

Chi-square test and cross-tabulation were done to determine the relationship between categorical variables under study. It was found that FPBE teaching pedagogy and the reasons which made students join the nursing program were significantly related to the intrinsic motivation of the undergraduate nurse students to learn ($X^2 = 7.041^a$, p < 0.01) and ($X^2 = 9.903^a$, p < 0.05) respectively. Other variables that did not show a statistically significant relationship with intrinsic motivation as shown in Table 4.

Table 4
Factors related to and the effect of FPBE on intrinsic motivation, among undergraduate nurse students between FPBE and NFPBE groups (n = 401)

Variables	Yes		No		P-value
	N	%	N	%	
Intervention	89	29.8	45	44.1	$X^2 = 7.041^a$
FPBE	210	70.2	57	55.9	0.008
NFPBE					
Gender	202	67.6	62	60.8	$X^2 = 1.552^a$
Males	97	32.4	40	39.2	0.213
Females					
Age	20	6.7	11	10.8	$X^2 = 2.316^a$
< 24 Yrs.	220	73.6	75	73.5	0.314
25–30 Yrs.	59	19.7	16	15.7	
> 30 Yrs.					
Marital status	278	93.0	93	91.2	$X^2 = 0.356^a$
Singles	21	7.0	9	8.8	0.551
Married					
Accommodation status	209	69.9	69	67.6	$X^2 = 0.181^a$
In campus	90	30.1	33	32.4	0.670
Out campus					
Interest	223	74.6	73	71.6	$X^2 = 0.357^a$
Yes	76	25.4	29	28.4	0.550
No					
Satisfaction	227	75.9	75	73.5	$X^2 = 0.234^a$
Yes	72	24.1	27	26.5	0.629
No					
Reasons for choosing to nurse as a career	162	54.2	48	47.1	$X^2 = 9.903^a$
Own choice	52	17.4	32	31.4	0.019
Parents/peer pressure	59	19.7	13	12.7	
Easier to get a job	26	8.7	9	8.8	
Entry qualifications					
Learning difficulties	61	20.4	19	18.6	$X^2 = 1.209^a$
Inadequate and difficulty in accessing updated learning materials	92	30.8	31	30.4	0.877
Complex course contents	43	14.4	12	11.8	
Inadequate support from lecturers	76	25.4	28	27.5	
Limited time	27	9.0	12	11.8	
No conducive environment					
Source: Field Data (2019)					

The effect of FPBE on intrinsic motivation, among undergraduate nurse students between FPBE and NFPBE groups

Binary and multinomial logistic regression was done to determine the extent to which FPBE and the reasons that made nurse students join nursing programs had in motivating them to learn. Findings in Table 5 below indicate that participants in an intervention group were 1.720 (AOR) times

more likely to be motivated to learn against participants in the control counterparts ($p < 0.05$, CI: 1.122, 2.635). However, the reasons that made nurse students join nursing programs had no influence on motivating students to learn when adjusted to other variables ($p > 0.05$).

Table 5
Univariate, Binary, and multinomial logistic regression to determine the effect of FPBE on intrinsic motivation, among undergraduate nurse students, between FPBE and NFPBE groups (n = 401)

VARIABLES	OR	95% CI		P-value	AOR	95% CI		P-value
Intervention	1.729	**Low**	**Upper**	0.012	1.720	**Low**	**Upper**	0.013
FPBE	0.483	1.130	2.646	0.001	.	1.122	2.635	.
NFPBE (rf)		.	.			.	.	
Reasons for choosing to nurse as a career	1.168	0.513	2.662	0.711	1.214	0.528	2.787	0.648
Own choice	0.562	0.234	.1.352	0.198	0.578	0.239	1.402	0.225
Parents/peer pressure	1.571	0.597	4.132	0.360	1.635	0.616	4.337	0.324
Easier to get a job	0[b]	.	.			.	.	.
Entry qualifications (rf)								
Source: Field Data (2019)								

Factors related to and the effect of FPBE on Extrinsic motivation, among undergraduate nurse students between FPBE and NFPBE groups

Extrinsic motivation furthermore, was another variable studied under the learning motivation. A chi-square test and cross-tabulation were performed to test the relationship between categorical variables. Findings in Table 6 below show that FPBE teaching pedagogy was related to extrinsic learning motivation of the undergraduate nurse students ($X^2 = 9.876^a$, $p < 0.01$) and accommodation status of students likewise showed to be related to their extrinsic motivation to learn ($X^2 = 11.421^{a,}$ $p < 0.01$). Other variables did not show significant relationships under this aspect as shown in the table.

Table 6
Factors related to and the effect of FPBE on the Extrinsic motivation, among undergraduate nurse students between FPBE and NFPBE groups (n = 401)

Variables	Yes		No		P-value
	N	%	N	%	
Intervention	85	40.5	49	25.7	$X^2 = 9.876^a$
FPBE	125	59.5	142	74.3	0.002
NFPBE					
Gender	146	69.5	118	61.8	$X^2 = 2.667^a$
Males	64	30.5	73	38.2	0.102
Females					
Age	12	5.7	19	9.9	$X^2 = 5.673^a$
< 24 Yrs.	151	71.9	144	75.4	0.059
25–30 Yrs.	47	22.4	28	14.7	
> 30 Yrs.					
Marital status	191	91.0	180	94.2	$X^2 = 1.563^a$
Singles	19	9.0	11	5.8	0.211
Married					
Accommodation status	130	61.9	148	77.5	$X^2 = 11.421^a$
In campus	80	38.1	43	22.5	0.001
Out campus					
Interest	156	74.3	140	73.3	$X^2 = 0.050^a$
Yes	54	25.7	51	26.7	0.822
No					
Satisfaction	155	73.8	147	77.0	$X^2 = 0.535^a$
Yes	55	26.2	44	23.0	0.464
No					
Reasons for choosing to nurse as a career	109	51.9	101	52.9	$X^2 = 0.370^a$
Own choice	43	20.5	41	21.5	0.946
Parents/peer pressure	40	19.0	32	16.8	
Easier to get a job	18	8.6	17	8.9	
Entry qualifications					
Learning difficulties	50	23.8	30	15.7	$X^2 = 5.280^a$
Inadequate and difficulty in accessing updated learning materials	63	30.0	60	31.4	0.260
Complex course contents	30	14.3	25	13.1	
Inadequate support from lecturers	48	22.9	56	29.3	
Limited time	19	9.0	20	10.5	
No conducive environment					
Source: Field Data (2019)					

The effect of FPBE on Extrinsic motivation, among undergraduate nurse students between FPBE and NFPBE groups

As shown in Table 7 below, a univariate and binary logistic regression was performed. Participants who were exposed to FPBE pedagogy were 0.676 (AOR) times less likely to be extrinsically motivated to learn than participants who were exposed to conventional teaching methods ($p > 0.05$,

CI: 0.405, 1.129). On the other hand, participants who were living on the campus were 0.591 (AOR) times less likely to be extrinsically motivated than the participants who were living out campus ($p > 0.05$, CI: 0.349, 1.002).

Table 7
The effect of FPBE on Extrinsic motivation, among undergraduate nurse students between FPBE and NFPBE groups (n = 401)

VARIABLES	OR	95% CI		P-value	AOR	95% CI		P-value
Intervention	0.507	**Low**	**Upper**	0.002	0.676	**Low**	**Upper**	0.134
FPBE	1.136	0.331	0.777	0.298	.	0.405	1.129	.
NFPBE (rf)		.	.			.	.	
Accommodation status	0.472	0.3.4	0.732	0.001	0.591	0.349	1.002	0.051
In campus	1.138	.	.	0.281	1.210			0.134
Out campus (rf)								

Source: Field Data (2019)

Factors related to and the effect of FPBE on Amotivation, among undergraduate nurse students between FPBE and NFPBE groups

Chi-square and cross-tabulation tests were employed to find out the relationship between variables. Table 8 indicates the statistically significant relationship between FPBE teaching pedagogy and Amotivation to learn among participants ($X^2 = 6.153^a$, $p < 0.01$). No other factors seemed to have a significant relationship with the nurse students' amotivation to learn as shown in the table.

Table 8
Factors related to and the effect of FPBE on Amotivation among undergraduate nurse students between FPBE and NFPBE groups (n = 401)

Variables	Yes		No		P-value
	N	%	N	%	
Intervention	108	37.0	26	23.9	$X^2 = 6.153^a$
FPBE	184	63.0	83	76.1	0.013
NFPBE					
Gender	185	63.4	79	72.5	$X^2 = 2.936^a$
Males	107	36.6	30	27.5	0.087
Females					
Age	19	6.5	12	11.0	$X^2 = 2.854^a$
< 24 Yrs.	215	73.6	80	73.4	0.240
25–30 Yrs.	58	19.9	17	15.6	
> 30 Yrs.					
Marital status	268	91.8	103	94.5	$X^2 = 0.845^a$
Singles	24	8.2	6	5.5	0.358
Married					
Accommodation status	198	67.8	80	73.4	$X^2 = 1.165^a$
In campus	94	32.2	29	26.6	0.280
Out campus					
Interest	214	73.3	82	75.2	$X^2 = 0.155^a$
Yes	78	26.7	27	24.8	0.694
No					
Satisfaction	217	74.3	85	78.0	$X^2 = 0.574^a$
Yes	75	25.7	24	22.0	0.449
No					
Reasons for choosing to nurse as a career	149	51.0	61	56.0	$X^2 = 0.783^a$
Own choice	63	21.6	21	19.3	0.854
Parents/peer pressure	54	18.5	18	16.5	
Easier to get a job	26	8.9	9	8.3	
Entry qualifications					
Learning difficulties	59	20.2	21	19.3	$X^2 = 2.495^a$
Inadequate and difficulty in accessing updated learning materials	85	29.1	38	34.9	0.646
Complex course contents	38	13.0	17	15.6	
Inadequate support from lecturers	80	27.4	24	22.0	
Limited time	30	10.3	9	8.3	
No conducive environment					
Source: Field Data (2019)					

The effect of FPBE on Amotivation, among undergraduate nurse students between FPBE and NFPBE groups

A univariate and binary logistic regression was performed to determine the association between FPBE teaching pedagogy and the state in which, nurse students were demotivated to learn. Table 9 below signpost that, participants who were exposed to FPBE teaching pedagogy were 0.538 (AOR) times less likely to experience amotivation to learn than their counterpart participants in the control group ($p > 0.05$, CI: 0.283, 1.022).

Table 9
Univariate and Binary logistic regression to determine the effect of FPBE on Amotivation, among undergraduate nurse students, between FPBE and NFPBE groups (n = 401)

VARIABLES	OR	95% CI		P-value	AOR	95% CI		P-value
Intervention	0.534	**Low**	**Upper**	0.014	0.538	**Low**	**Upper**	0.058
FPBE	0.451	0.324	0.880	0.000	.	0.283	1.022	.
NFPBE (rf)		.	.			.	.	
Source: Field Data (2019)								

Discussions Of The Study Findings

Socio-demographic characteristics of the study participants

The current study noticed many male students (65.8%) joined the nursing programs as their first choice compared to females. These are discussed in this study to be one of the successes the nursing profession is earning in its revolution as compared to the past where female nurse students were many. However, these findings do not line up with those found by Kusumawaty, Kumara, Emilia & Haryanti (41) and Sabzevari, Abbaszade & Borhani (42), which showed that majority of females selected to join nursing as their first priority.

The variation above could be contributed to the day to day awareness creation about nursing programs and its career paths through various Media, advanced roles of nursing and the need for more qualified nurses' professionals. It is worth to observe both females and males selecting nursing as their pathway to advance their educational careers, for the sake of serving the community, as they were prepared for the patients' care responsibilities. On the other hand, it was worth too to observe a great number of men joining the nursing profession as this would clear out the belief which has existed for a long time that nursing was for females.

Intrinsic Motivation in Learning among Undergraduate Nurse Students

Motivation has always been the central issue in nursing education and even been referred to as the most complex and challenging issue, facing educators, and students today. Various teaching modalities are tested in different settings and programs to help motivate students to learn on their own with minimal support from educators. It has been observed in the current study that FPBE teaching pedagogy had a positive influence on intrinsic learning motivation among undergraduate nurse students. Students would demonstrate the ability to know what to learn, accomplish the learning activities and experience stimulation to learn more and more. Participants in an intervention group demonstrated highly learning the motivation for the pleasure as they felt teamwork and being occupied with learning tasks to be of importance in their academic life.

These findings match with those found by Gaber *et al.*, (14), which revealed problem-based learning could enhance learning force within a student, which influenced and directed behavior and willingness to put efforts, into achieving a goal or reward by decreasing their tension caused by their needs. Based on these facts, the researcher observed that FPBE teaching pedagogy could positively make nurse students, to become intrinsically motivated to learn and thus, become autonomous learners. This tells nursing educators that, when developing nursing curricula, course contents and other teaching and learning materials should make usage of FPBE teaching pedagogy in order to make nurse students are intrinsically motivated to learn.

Extrinsic Motivation in Learning among Undergraduate Nurse Students

This is an aspect that defines the ways students are motivated to learn through the influence of external stimuli such as environments, peer pressures, punishments, rewards just to mention a few. Undergraduate nurse students who were exposed to FPBE teaching pedagogy in this study nevertheless were fewer times likely to be extrinsically motivated to their learning process when compared to the participants who were under conventional teaching pedagogies. Nurse students demonstrated a motivation to learn without being influenced by external stimuli.

The status of extrinsic motivation was also observed among nurse students who were living on campus who were noted to be fewer times likely to develop the extrinsic motivation to learn, as compared to those who were living outside the campus. Burse students in the control group were learning for being identified or recognized by others that they were able to know and solve issues. They demonstrated a highly motivated to learn

by adopting the values or attitudes they were impressed to in order to be accepted by others in their learning process. Moreover, nurse students in the control group were highly motivated to learn due to the institutional regulations, principles, order, or rules

Amotivation to Learn among Undergraduate Nurse Students

This aspect measured the level to which nurse students were discouraged to learn by the teaching pedagogy, which was used in this study when controlled with other factors. It was found that participants who were exposed to FPBE teaching pedagogy demonstrated to be less demotivated in their learning processes, as compared to those in conventional teaching pedagogies. This has been discussed in this study to be attributed to the new teaching modality in the nature of FPBE with its associated setups.

These findings are not new as they link with those found by Khamoushi *et al*., (26), which revealed low academic achievements of undergraduate nurse students, to be attributed to the type of teaching pedagogies that educators used. The more the didactic teaching methods were used, the more students were demotivated to their learning process when compared to the usage of constructive teaching pedagogies. They then concluded that there was a necessity to respond appropriately in order to improve student's academic achievements.

Conclusions

This study builds on and extends the earlier research on the effects of FPBE on teaching and learning processes. It based on social constructivism, which believed in collaborative learning among undergraduate nurse students with reference to the development of motivation to learn. A well-developed and structured FPBE strategy have shown to be useful and feasible in the Tanzanian perspective in influencing intrinsic motivation to learn among nursing students in Tanzania. The success of FPBE was attributed to the provision of an opportunity for student's interactions and the fact that students were able to view the learning pathway in the motivation to learn. This was done through the vantage point of problem identification; they were able to propose learning issues, practice knowledge research and sharing, and then revisit the scenario to solve particular real problems.

The findings do throw light that FPBE teaching and learning pedagogy can positively influence the levels of intrinsic motivation to learn among students. Thus, the move to adopt facilitation in a problem-based environment teaching pedagogy in Tanzania is worth considering and needs to be continued. The elements of the FPBE, which were used in the current study, have the potential contributions to the development of competent graduate nurses. The quantitative findings of the current study, cannot offer any obvious and strong evidence of sustained development of motivation through conventional teaching methods.

Limitation Of The Study

During the implementation phase of this study, group leaders were trained to act as facilitators. This would affect their full participation in solving the presented problems and even make their colleagues not to take into serious their learning roles.

Abbreviations

AM……Amotivation

AI……..Auditing Inventory

AMS……..Academic Motivation Scale

AOR……..Adjusted Odds Ratio

CI……..Confidence interval

EM…….Extrinsic Motivation

EMI……Extrinsic Motivation Identified

EMIT……..Extrinsic Motivation Introjected

ETR……Extrinsic Motivation external Regulation

FPBE……..Facilitation in a Problem Based Environment

IM……..Intrinsic Motivation

IMC……...Intrinsic Motivation towards Accomplishment

IMK……....Intrinsic Motivation to Know

IMS……....Intrinsic Motivation to experience Stimulation

IRRC……...Institutional Research Review Committee

NFPBE……....Non Facilitation in a Problem Based Environment

PBL……Problem-based learning (PBL)

PhD……Doctor of Philosophy

QMLSN……..Questionnaires on Motivation to Learn Strategies in Nursing (QMLSN)

SD……...Standard Deviation

SPSS……..Statistical Product for Service Solutions (SPSS

UDOM……...The University of Dodoma

WHO……..World Health Organization (WHO)

Declarations

'Ethics approval and consent to participate: applicable', All study participants in the current study will be asked for informed consent for their participation.' The study was approved by the University of Dodoma (UDOM) Institutional Research Review Committee (IRRC)', Ethics Clearance to reach higher Training Institutions: approved by Principals and deans of the respective institutions/schools.

Consent for publication: not applicable

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Contributions To The Literature

- Profession associations as welfare organs may be enlightened about the need to incorporate Facilitation in a Problem-Based Environment (FPBE) into reproductive health educational curricula.
- Findings from this study give light to educational program developers about conditions under which curricula innovations in the nature of FPBE can work in this case.
- Findings constitute a vital knowledge necessary for instructors on how to design and implement curricula basing on FPBE
- Researchers will also use the results as baseline data for further interventional studies or projects in the nature of FPBE

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