ASSESSING MODEL OF TEACHING BELIEFS AND PRACTICES: USING STRUCTURAL EQUATION MODELLING

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ABSTRACT

Reviewing the literature review, there is a need for an alternate model to explain the phenomenon and the relationship between Lecturers' Beliefs on Teaching and Practices for the improvement of lecturers' professional development. Thus, this study aims to assess the measurement model for teaching beliefs functions, and practices among lecturers. The sample of this study was 103 lecturers from Community Colleges, Yemen. Structural Equation Modelling was used to assess and analyze the proposed model for lecturers' beliefs on teaching functions and practices. Findings of the modified model showed the best-fit indices of the proposed measurement model were improved and showed good goodness of fit. Based on the findings, a tested model assessment can be used as a recommended model for Lecturers' Beliefs on Teaching Functions and Lecturers' Teaching Practices among community colleges' lecturers.

Keywords: lecturers' beliefs, teaching practices measurement model and assessment,

Introduction

Lecturers' beliefs and their understanding of teaching, as well as learning, play an important role in their classroom practices and their professional growth (Prawat, 1992; Bandura, 1986; Harste and Burke, 1977; Kuzborska, 2011; Mamsour, 2009; Pajares and Nespor, 1992). Lectures make decisions about classroom instruction in light of theoretical beliefs they hold about teaching and learning. Lecturers' beliefs affect their objectives, procedures, materials, interaction patterns of the classroom, their teaching functions, their students, and the institutions where they work. Lecturers interpret, respondent and innovate only in ways related to their current beliefs and practices. Therefore, many researchers emphasized the need of investigating lecturers' thinking and teaching practices (Pajares, 1992; Pajares and Pomeroy, 1993; Clark, 1988, Kennedy, 1997; Mansour, 2009; Standen, 2002; Mansour, 2010; Gahin, 2001; Abell and Roth, 1992).

Lecturers' classroom practices and their professional growth are influenced by their beliefs of teaching and learning (Prawat, 1992; Harste and Burke, 1977; Kuzborska, 2011; Mamsour, 2009; Pajares and Nespor, 1992; Albion, 2001; Mofreh, 2018). Lectures decide about classroom instruction theoretical beliefs about teaching and learning. Therefore, many researchers pointed the need of examining lecturers' thinking and teaching practices (Pajares, 1992; Pajares and Pomeroy, 1993; Clark, 1988, Kennedy, 1997; Mansour, 2009; Standen, 2002; Mansour, 2010; Abelson, 1979). Several reasons explain the complexity of the relationship between lecturers' beliefs and practices including their knowledge, goals, educational context, and pedagogy (Mansour, 2009; Gahin, 2001; Abell and Roth, 1992, Mofreh, et.al, 2013).

Gauging teacher quality in a developing context like Yemen is difficult in the absence of standardized evaluation metrics. However, the Ministry of Education and many researchers have reported repeatedly on what they observed to be low teacher quality (Ministry of Education, 2008; Dyer, 2007, Guarcello et al. 2006, Yuki and Kameyama, 2013). These reports draw from quantitative figures on teacher qualifications and attendance, qualitative observations on classroom practices, and student response survey data. Collectively, this data paints a dire portrait of teacher quality in Yemen's education system. According to the literature, four key indicators imply low quality in teaching: (i) lack of qualifications and professional training, (ii) teacher absenteeism, (iii) prevalence of teacher-centered methodologies and other negative classroom practices, and (iv) the prevalence of emotional and physical abuse by teachers.

Community Colleges (CC) in Yemen (CC) recognized that effective lecturers are an important factor to continue its mission and building skilled graduated students for the labor market. There is a need to understand how lecturers think about their teaching functions and practices. The beliefs of lecturers may play an important role in explaining the individuals' change of their academic performance. These beliefs were used to assess new thoughts and concepts about

teaching that lecturers confront in their teaching practice in classes (Kennedy, 1997). Therefore, those teachings that are shaped their beliefs are recognized and characterized as “what is new?” (Kenndey, 1997; Bruner, 1996; Raths, 2001). These beliefs provide lecturers with possible examples of ways to practice those promoted thoughts, solving conflicts between different beliefs, organizational supports, constraints, and similar practices.

An understanding of the relationship between Lecturers’ Beliefs on Teaching and Teaching Practices is important for the improvement of lecturers’ professional development (Kuzborska, 2011; Strong 2003, Al-Amri, 2012; Hiadar 2009). Lecturers make decisions about classroom instruction in the light that theoretical beliefs have on teaching and learning (Harste and Burke, 1977). That is, lecturers, interpret and respond to innovations only in the ways which relate to their existing beliefs and practices. Therefore, many researchers emphasized the need of researching the lecturer’s beliefs and their relation to teaching practices. Thus, this study aims to assess the measurement model which can be used to measures the relationship between the lecturers’ beliefs of teaching functions and their teaching practices.

Background of the Problem

According to the report by Alabidi, (2014), Community Colleges (CC) in Yemen has a lack of written policies and regulations that spells out the management expectations for the teacher as a responsible academic (in terms of reporting grades, documenting students’ progress, seek of professional growth, attending meetings, participation in committees and activities, etc.). In other words, if we want to evaluate the academics’ professional performance, community colleges first need to have their expectations clearly stated. Therefore, CC does not have expertise in planning and coordinating the professional growth of its academic staff. Therefore, the lack of experienced personnel to be in charge of teacher’s professional development is a great barrier.

To make lecturers of community colleges implement "teach better", it only makes sense to provide the skills they need at the levels they ask for and in a way that makes learning the skills practical for them. These skills must focus on the process of learning; increasing opportunities for quality educational performance and success; offering positive orientation, guidance, and direction through coaching; motivating students to increase satisfaction for and development of learning to learn skills; recognizing and encouraging students' desire to learn; working to limit and/or eliminate learning obstacles; using effective performance as an expectation by which to improve students; and utilizing intellectual competencies to maximize instruction effectiveness (Sarapin and Vorvoreanu, 1999; Campbell et. al., 2004; Campbell and Norton, 2007; Chen, 2008).

As mentioned in the report by Alabidi, (2014) Community colleges in Yemen has a lack of written policies and regulations that spells out the management expectations for the teacher as a responsible academic (in terms of reporting grades, documenting students' progress, seek of professional growth, attending meetings, participation in committees and activities, etc.). In other words, if we want to evaluate the academics' professional performance, community colleges first need to have their expectations clearly stated. Therefore, Sanaa Community College does not have expertise in planning and coordinating the professional growth of its academic staff. Therefore, the lack of experienced personnel to be in charge of teacher's professional development is a great barrier.

According to the results of the survey carried out by the executive council of community colleges by Mullin et.al. (2013) about the employment of the faculty members during the past years, it can be concluded that:

i. All government community colleges have not fully committed to what came in the basic feasibility studies and the actual needs of the faculties concerning the employment of teaching staff in terms of quantity or type (specialization).
ii. Most community colleges hired faculty with specialties that are not taught in those colleges, such as community colleges in Sana'a, Aden, Sanhan, Sayoon, and Dalea.
iii. All colleges do not employ professionals or technicians despite the importance of their roles in the educational process.
iv. Some administrative staff was moved to the Academic staff, causing internal and external pressure on the colleges without adhering to the academic standards.

The results mentioned above in the report of the council of community colleges (2013) may indicate that the financial and administrative independence of these colleges that used in the wrong way (Alabidi, 2014). This led to deviations from the basic objective of the colleges. This is concerning opening new disciplines or employment of teaching staff or sending the faculty for academic qualification.

Lecturers of community colleges may play a passive role in teaching; they do not think creatively towards their teaching; they follow the traditional view in teaching and do not follow the new theories in teaching. Lecturers' lack of knowledge of their teaching functions may imply a lack of formal job descriptions of lecturers' responsibilities and roles, the absence of self-assessment for lecturers, the appraisal forms of appraising lectures may be designed informal way and do not cover the teaching functions, and absence or lack of feedback of appraising lecturers from their assessors (Mullin et.al.; Alabidi, 2014, Mofreh, 2013). As a result, lecturers who refer to the traditional teaching theory cannot change their beliefs unless they change their style of teaching to change their beliefs and perceptions, which would lead to improvement in teaching practices.

Lecturer performance teaching at community colleges was low and affected the enhancement of their professional knowledge and experience (Mofreh et.al, 2013 and Alabidi, 2014). The lack of knowing lecturers' functions on teaching implies that low teaching practices reflect their professionalism. Lecturers' teaching professional identities arise from their images of lecturers, their beliefs and concepts of a "good lecturer" and their theories about teaching (Flores and Day, 2006; Lortie, 1975; Sugrue, 1997).

Literature review

Beliefs about Teaching and Learning

Teaching and learning have shifted from lecturers' behaviors to lecturers' subject knowledge and pedagogical knowledge and their beliefs and self-efficacy have been examined to identify the role such factors have in lecturers' effectiveness. Attentions were given to lecturers' own beliefs about, and attitudes to, teaching and the subjects they teach arguing that these deeper structures are more important to teaching quality than immediately observable behaviors (De Corte and Greer 1996, Fennema and Loef-Franke 1992, Thompson 1992, Askew et al.1997). Furthermore, research in psychology has seen a move away from traditional behaviorist models towards models stressing individuals' complex information processing strategies, metacognition, and knowledge construction. The various models emerging (constructivism and information processing theory, for example) share an emphasis on pupils' active construction of learning, a view that differs from the "stimulus-response" behaviorist models that underlie traditional lecturers' effectiveness research. Coupled with this has been an increasing emphasis in society on higher-order thinking and processing, seen as necessary for societies to function competitively in an increasingly complex and knowledge-based economic order.

The beliefs about the nature of teaching and learning include "direct transmission beliefs about learning and teaching" and "constructivist beliefs about learning and teaching These dimensions of these beliefs are well established in educational research at least in Western countries and have also received support elsewhere (De Corte and Greer 1996, Fennema and Loef-Franke 1992, Thompson 1992, Askew et al.1997 Kim, 2005; Campbell et.al., 2004). The direct transmission view of student learning implies the role of lecturers is to transfer knowledge in a clear and structured way, to explain the correct solutions to give students clear and resolve problems, and to ensure calm and concentration in the classroom. By contrast, a constructivist view focuses on students not as passive participants, but as active participants in the process of acquiring knowledge. Lecturers who holding this view emphasize facilitate student research, prefer to allow students to develop solutions to problems on their own and allow students to play an active role in teaching activities. In this sense, the development of thinking and reasoning

processes stands out more than the acquisition of specific knowledge (Staub and Stern, 2002; Askew et al., 1997, Kim, 2005; Campbell et.al, 2004).

Beliefs Based on Constructivist View

Constructivists viewed that learning is seen as active and knowledge is constructed in the piecemeal expansion of networks of ideas by interaction and materials in the environment (Jarvis, 2006; Kynigos and Argyris, 2004; Standen, 2002; Aguirre and Speer, 2000; Lacorte and Canabal, 2005; Marshall, 1992; Mohamed, 2006). In constructivism view, lecturers of science promote group learning, in which students discuss two or three approaches to a given problem with little or no interference from the lecturers. However, traditional lecturers who see a given problem have a unique solution, while constructivist lecturers have a preference to find out how students see the problem and why their paths to solutions look promising for them. In addition, constructivist lecturers assist students to integrate their previous experiences into current situations (Yager, 1995). Mansour (2009) stated that science students seldom see anything about research having no relevance or applicability to their own lives.

Such views about teaching and learning are partly related to the values and beliefs of the culture that lecturers belong to (Kennedy and Kennedy 1998). Kennedy and Kennedy (1998) describe how national cultures and behaviors can affect pedagogical beliefs and cultures in the classroom. For example, there is a distinction between countries with large power distance measures (where power is concentrated in the hands of a few) and the distance measures which are small power (where power is less hierarchical and decentralized). They argued that cultures with high power distance are more likely to be confirmed in the belief that the lecturer should be the authority in control of the dynamics in the classroom and control of knowledge for transmission of education (Barnes, 1976). In contrast, in the cultures at the other end of the spectrum, the distribution of power in the classroom would be different, with the lecturer playing a facilitator role rather than the authority.

Lecturer's Beliefs and Teaching Practices

Many researchers claim that implementing any reform program heavily be influenced by lecturers (Haney, Czerniak, and Lumpe, 1996; Levitt, 2002; Pajares, 1992; Jarvis, 2006; Campbell et al.., 2004; Campbell, 2007). Lecturers play an important role in educational institutions and classrooms change (Prawat, 1992). However, lecturers are also seen as the core obstacles to change their traditional beliefs. According to Bandura (1986), the decisions of an individual through his / her life are strongly influenced by his / her beliefs. Pajares argued that beliefs are "best indicators of the decisions individuals make throughout their lives". Lecturers' beliefs play an important role in deciding about curriculum and lecturers instruction program

(Nespor and Pajares, 1992). In short, educational researchers have argued the need for more detailed and direct research of the relationship between lecturers' beliefs and practices in education (Pajares, 1992 and Pomeroy, 1993). Therefore, the relationship between beliefs and teaching practices is well documented in the literature of science education.

Series of researches have studied the relation of lecturers' beliefs and teaching practices. Pajares (1992) in his study supported the idea of the influences of lecturers' beliefs on their performance in the classroom. Similarly, the value of a person who guides behaviors of life was developed by the person's beliefs (Ajzen, 1985). The beliefs of lecturers have a strong influence on teaching practices (Ernest, 1989). The beliefs and theories of lecturers have been described as "the wealth of knowledge that lecturers have that affects their planning, interactive thoughts, and ideas and decisions" (Clark and Peterson, 1986).

Theoretical Framework

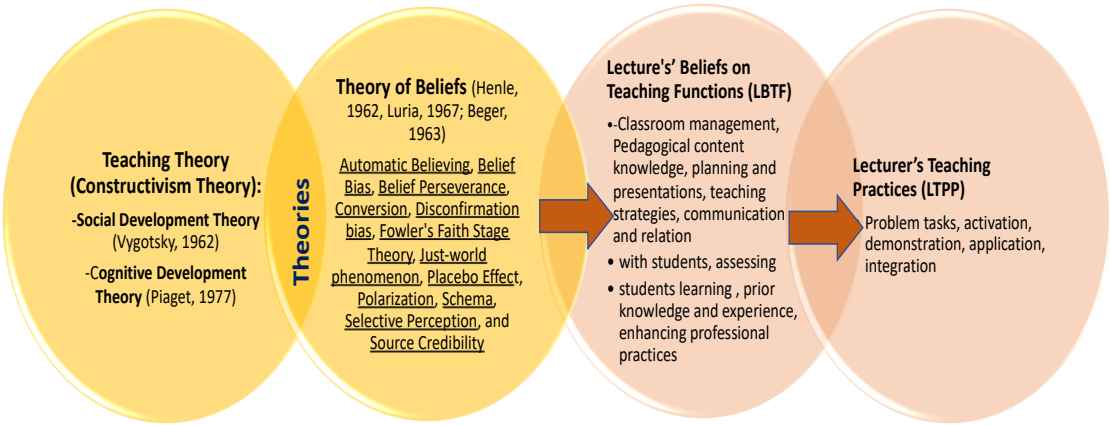

Figure 1: Theoretical framework

The theoretical framework of this study is based on constructivism theory including Piaget and Vygotsky' theories and Merrill's' first principles of instruction. The theoretical framework is the structure that can hold and support a theory of a research study (Casey, 1996; Swanson, 2013 and Blaxter and Hughes, 2010). A theoretical framework includes concepts, with their definitions, and existing theories that are used for particular research. Figure 1 shows the theoretical framework of this research.

The theoretical framework involved the variables the research aims to investigate such as Lectures' Beliefs on Teaching Functions (LBTF) as an independent variable and Lecturers' Teaching Practices (LTP) as a dependent variable, These concepts were investigated based on the research theory. The independence of interpreting one's own experience is emphasized by constructivism (Roth, 1994). In addition, the issue of teaching in the education literature is discussed from the point of view of the transference from theory to teaching practices (De Corte, 2000; Defazio, 2006, Randi and Corno, 2007). Many studies claimed that improving student learning and satisfaction can be achieved by implementing the first principle of instruction in teaching and learning (Merrill, 2006; Thomson, 2002; Frick et al, 2007). This model of the first principle of instruction of Merrill is based on a constructivism theory as a theory of teaching and learning.

Structural Equation Modelling

Structural Equation Modelling (SEM) was used based on the objective of this study to assess the measurement model for the Lecturer's Beliefs on Teaching and Teaching Practice at community colleges. Several ordered steps were followed to test the model. These included developing the theoretical model, conducting the CFA, constructing a path diagram, assessing model identification, evaluating estimates and model fit, interpreting and analyzing the model, and the final model (Stevens, 2002; Norirs, 2005; Kenny, 2006; Garson, 2009; Byrane, 2010; Kline, 2011; Brown, 2011; Zainuldeen, 2012). The relationships between indicators or observed variables and latent variables are indicated by arrows. The path model depicts directional relationships among variables. A straight arrow is used to specify a recursive relationship.

To decide if the model will be accepted or rejected, at least 3 to 4 tests are recommended. The goodness of fit was evaluated using chi-square for the null hypothesis significance test (Haire et al., 1995; Holmes-Smith, 2006; Zainuldin, 2012). Chi-square (x2) is an absolute fit index. A non-significant chi-square showed the parameters that were estimated for the model fit the data.

For this study, the comparative fit index (CFI) and standardized root mean were used. The CFI had a cut-off value of equal to or greater than 0.90 for an acceptable fit and equal to or greater than 0.95 for a good fit (Hu and Bentler, 1999; Byrane, 2010; Zainuldin, 2012) less than .05 was

used to show a good model. The root means the square error of approximation (RMSEA) is less than .05 for a good fit or less than .08 for an acceptable fit (Kline, 2011 and Norris, 2005).

For adequate theory testing, the model needed to be over-identified. To achieve this, three or more indicators were used for each of the latent variables (Garson and Norris, 2005). SEM includes CFA, which was used to test the measurement model as previously showed. Parameter estimates were used to show how well the indicators corresponded to the latent variables (factors). Parameter estimates used for this include variance and covariance of the indicators and factor loadings and residuals. Indicators should have coefficients (factor loadings) of 0.6 or higher on the latent factors (Awang, 2012).

Materials and Methods

This research was designed as quantitative research. This study collected data using developed questionnaires to measure the relationship between the beliefs of teaching and practices among the lecturers. The total number of respondents of this study was 106, however, only 103 were valid and responded to the study. The convenience sample of 103 lecturers was recruited for this study from Community Colleges (CC), Yemen. SEM and multi procedures were used to analyze the model fit and investigating the relationship between the LBTF and LTP. SEM was used to produce empirical evidence of the good fit of the recommended model to measure the LBTF and LTP to answer the research questions "Is there a significant relationship between LBTF and LTP?"

Two developed instruments were used and tested to measure the LBTF and LTP to answer the research question. The developed LBTF questionnaire contained 8 constructs namely Classroom Management (CM), Pedagogical Content Knowledge (PCK), Planning and Presentations (PP), Teaching Strategies (TS), Communication and Relation with Students (CRS), Assessing Students Learning (ASL), Prior Knowledge and Experience (PKE) and Enhancing Professional Practices (EPP) including 67 items. The developed LTP contained five constructs namely Integrating New Knowledge (INK), Performing the Real-World Problem (PRWP), Learner's Prior Knowledge (LPK), Practicing Solving Problem (PSP), and Real World relevant Problem (RWP) including 30 items. The instrument validity and reliability of LBTF and LTP were tested using Rasch Model analysis. The RM is one of a group of models originating from item response theory and was initially developed in connection with the construction of ability tests (Baker, 2001, Bond and Fox, 2001; O'Hrien, 1989). Important aspects of RM would be considered including item polarity, dimensionality, infit and misfit, item and person reliability, item and person separation, rating scale, item and person map. Understanding these concepts related to the RM analysis could help the interpretations of Rasch Model analysis results of LBTF and LTP.

Results

Validity and Reliability of LBTF and LTP Instruments

Measuring the lecturers' beliefs requires a measurable instrument to be developed and tested to clarify how beliefs reform Lecturers' Teaching Functions and Teaching Practices. Thus, psychometric properties were tested for both LBTF and LTP questionnaires to determine if these two instruments are sufficiently valid and reliable as measurement tools. Thus, RM analysis was used to test the validity and reliability of LBTF and LTP questionnaires. In RM Analysis, item polarity or point measure correlation (PTMEA Corr.) was the early detection of construct validity. For the analysis of these constructs items, it appears MNSSQ infit analysis value should be 0.5 <x <1.5, and PTMEA value should be positive and + 0.2 <x<1(Linacare, 2005). Also, other criteria to be considered to determine the misfit item is the standardized fit statistic (Zstd) value with acceptable range value -2<ZSTD<+2 (Bond and Fox, 2007). Although, the construct items had a positive correlation, 5 items including TS.23, PP.52, TS.21, PP.57, ASL.41, PP.67, and TS.15 were omitted due to their MNSQ value of infit and outfit was greater than 1.5 as shown in Table 1.

Table 1: Item polarity and fit analysis of LBTF

Measure	Model S.E	Infit		Outfit		Pt-Measure		ExactOBS%		Items
		MNSQ	ZSTD	MNSQ	ZSTD	CORR.	EXP.	Match	EXP%	
-.83	18	**1.33**	**2.0**	**1.65**	**3.3**	**.32**	**61**	**57.6**	**63.0**	**EPP.67**
1.14	.13	**1.80**	**4.5**	**2.14**	**5.8**	**.42**	**.64**	**42**	**.50.7**	**EPP.52**
-.80	. 18	1.00	.1	1.16	1.0	.47	.6	55.3	.62.8	EPP.64
-.68	.17	.95	-.2	1.25	1.5	.47	.61	57.3	61.8	EPP.63
-1.44	20	1.00	.1	1.21	1.0	.49	.58	62.1	70.5	EPP.61
-1.06	.19	1.03	.3	1.07	.4	.50	.60	67.0	65.5	EPP.68
1.45	**.12**	**1.19**	**1.3**	**2.16**	**5.9**	**.50**	**.63**	**42.7**	**47.8**	**TS.23**
-.96	.18	.87	-.8	1.38	2.0	.50	.60	64.1	64.2	EPP.62
1.48	.12	1.24	1.6	1.50	2.9	.50	.63	36.9	47.8	TS.15
-.74	18	.87	-.8	1.05	.4	.50	.61	60.2	62.1	EPP.66
.58	**14**	**1.81**	**4.3**	**1.79**	**4.3**	**.51**	**.64**	**46.6**	**54.5**	**EPP.57**
-.90	.18	.86	-.9	1.01	.1	.54	.60	70.9	63.6	EPP.65
.42	.14	1.67	3.6	1.60	3.4	.54	.64	2.4	56.0	ASL.41

.93	.13	1.22 1.4	1.30 1.9	.55 .64	48.5 2.1	EPP.53
1.45	**.12**	**1.18** **1.3**	**1.99** **5.2**	**.55** **.63**	**40.8** **47.8**	**TS.21**
-.93	.18	1.46 2.7	1.48 2.5	.57 .60	60.2 64.1	PP.58
.50	.14	.96 -.2	1.00 .0	.57 .64	61.2 55.5	CM.3
.42	.1	.90 -.6	.94 -.3	.57 .64	64.1 56.0	TS.26
.93	.13	1.13 .9	1.21 1.4	.58 .64	54.4 52.1	PP.8
36	.15	1.12 .8	1.12 .8	.58 .64	60.2 56.1	PP.13
.77	.14	1.23 1.5	1.29 1.8	.59 .64	42.7 53.1	EPP.49
-.26	16	1.48 2.8	1.35 2.1	.59 .63	60.2 58.9	PCK.7
1.65	.12	1.05 .4	1.34 2.1	.61 .63	42.7 46.7	TS.28
-.13	16	1.08 .6	1.15 1.0	.61 .63	64.1 57.8	TS.24
.25	.15	1.20 1.3	1.17 1.1	.61 .64	47.6 56.2	PCK.6
.74	14	.92 -.5	.94 -.4	.61 .64	53.4 53.1	TS.16
.64	14	1.06 .4	1.10 .7	62 .64	48.5 53.4	TS.25
-.34	.16	1.16 1.1	1.30 1.8	.62 .63	67.0 59.4	PP.11
-.31	16	1.06 .4	1.04 .3	.62 .63	59.2 59.1	ASL.43
1.02	.13	.78 -1.5	.95 -.3	.62 .64	60.2 51.4	TS.14
-.28	16	1.41 2.4	1.38 2.2	64 .63	56.3 58.9	PCK.5
-.20	16	1.33 2.0	1.25 1.6	.64 .63	61.2 58.4	ASL.44
-.74	.18	1.05 .4	1.12 .7	.64 .61	64.1 62.1	EPP.54
.18	.15	.86 -.9	.92 -.5	.64 .64	56.3 56.0	TS.27
-.59	17	1.02 .2	1.00 .1	.65 .62	55.3 60.9	PCK.4
.14	15	|1.01 .1	1.03 .3	.66 .64	63.1 56.2	ASL.36
-.50	.17	.78 -1.5	.91 -.5	.66 .62	60.2 60.5	CM.2
.23	.15	.85 -.9	.87 -.8	.66 .64	63.1 56.1	PP.10
-.56	17	.92 -.5	.93 -.4	.66 .62	57.3 60.7	CM.1
-.68	.17	.85 -1.0	.93 -.4	.67 .61	69.9 61.8	EPP.60
.42	.14	.95 -.3	.94 -.4	.67 .64	55.3 56.0	TS.22
-.53	.17	.86	.84	.67	60.2	ASL.42

		-.9	-1.0	.62	60.6	
.02	.15	1.20 1.3	1.14 .9	.67 .63	56.3 56.3	EPP.55
.33	.15	.78 - 1.4	.84 -1.1	.68 .64	61.2 56.1	PP.9
.42	14	.76 -1.6	.73 -1.9	.68 .64	64.1 56.0	CRS.32
-.68	17	1.10 .7	.98 .0	.68 .61	66.0 61.8	EPP.56
-.10	.16	.66 -2.5	.70 -2.1	.68 .63	66.0 57.6	PP.12
-1.36	.20	.94 -.3	.81 -.9	.69 .58	72.8 69.5	EPP.59
-.26	.16	.99 .0	.90 -.6	.69 .63	59.2 58.9	EPP.51
-.59	.17	.66 -2.4	.69 -2.1	.70 .62	68.9 60.9	CRS.30
-1.70	.22	1.20 1.1	.76 -1.0	.70 .56	82.5 75.3	TS.29
.56	.14	.73 -1.9	.74 -1.8	.71 .64	58.3 54.8	TS.18
-.10	.16	59 -3.1	.60 -3.0	.71 .63	65.0 57.6	TS.20
-.68	.17	.82 -1.2	.75 -1.6	.71 .61	68.9 61.8	ASL.37
.20	.15	.68 -2.2	.70 -2.1	.71 .64	68.0 56.1	TS.19
-.03	.16	.66 -2.4	.66 -2.5	.72 .63|	65.0 56.7	TS.17
.14	.15	.83 -1.1	.75 -1.8	.72 .64	65.0 56.2	ASL.45
.07	.15	.70 -2.1	.71 -2.1	.72 .63	65.0 56.1	CRS.31
-.13	.16	.95 -.3	.91 -.6	.72 .63	62.1 57.8	PKE.48
.60	.14	.65 -2.6	.69 -2.2	.74 .64	62.1 54.0	ASL.39
.44	.14	.82 -1.2	.81 -1.3	.75 .64	62.1 56.0	ASL.34
.33	.15	.68 -2.3	.69 -2.3	.75 .64	61.2 56.1	EPP.50
.07	.15	.59 -3.0	.59 -3.1	.75 . 63	68.0 56.1	ASL.40
-.01	.16	.62 -2.8	.62 -2.8	.75 .63	64.1 56.7	PKE.46
.36 .	15	.55 - 3.4	.54 -3.6	.76 .64	72.8 56.1	ASL.35
-.05	.16	.66 -2.4	.64 -2.7	.76 .63	72.8 57.3	ASL.38
-.10	.16	.64 -2.6	.61 -2.9	.78 .63	66.0 57.6	PKE.47
.02	.15	.64 -2.6	.60 -3.0	.79 .63	68.9 56.3	CRS.33

Table 2 showed a good item correlation and item fit for LTP questionnaires. These findings indicated very good items signifying that all the items were appropriate for both further statistical analysis and inferences

Table 2: Item polarity and fit analysis of LTP

Measure	Model S.E	Infit		Outfit		Pt-Measure		Exact OBS%		Items
		MNSQ	ZSTD	MNSQ	ZSTD	CORR.	EXP.	Match	EXP%	
.33	.17	1.73	4.1	2.13	5.4	.51	.65	47.0	62.1	RWP.1
.00	.18	1.68	3.8	1.92	4.4	.49	.64	61.0	64.0	RWP.2
.30	.17	1.66	3.8	1.71	3.7	.47	.65	55.0	62.2	INK.28
-.10	.18	1.30	1.9	1.31	1.7	.59	.63	64.0	64.5	PSP.23
.45	.17	1.27	1.7	1.21	1.3	.54	.66	61.0	61.9	LPK.11
.84	.16	1.18	1.3	1.25	1.6	.56	.68	57.0	59.5	PRWP.14
1.12	.16	1.12	.8	1.18	1.2	.60	.69	57.0	57.6	PRWP.13
-.68	.19	1.06	.4	1.11	.6	.59	.59	68.0	67.4	RWP.3
.18	.17	1.09	.6	1.03	.3	.64	.65	60.0	62.7	RWP.4
-.07	.18	1.06	.4	1.08	.5	.67	.63	77.0	64.3	PRWP.19
-.40	.19	1.06	.4	.92	-.4	.64	.61	69.0	66.0	INT.30
.00	.18	1.01	.1	|1.00	.1	.62	.64	64.0	64.0	LPK.7
-.13	.18	1.01	.1	.97	-.1	.68	.63	71.0	64.4	PSP.20
.-.43	.19	.95	-.3	.98	.0	.63	.61	68.0	66.2	PSP.25
.27	.17	.95	-.3	.91	-.5	.60	.65	69.0	62.2	RWP.5
.45	.17	.94	-.4	.88	-.7	.61	.66	72.0	61.9	PRWP.18
-.13	.18	.91	-.6	.83	-1.0	.70	.63	70.0	64.4	PSP.21
.30	.17	.87	-.9	.90	-.6	.69	.65	67.0	62.2	PSP.22
-.23	.18	.90	-.6	.81	-1.0	.63	.62	67.0	64.9	LPK.8
.12	.18	.90	-.6	.87	-.8	.65	.64	73.0	63.2	LPK.12

-.68	.19	.84	.74	.65	70.0	INK.29
		-1.1	-1.3	.59	67.4	
-.68	.19	.84	.71	.69	75.0	INK.27
		-1.1	-1.5	.59	67.4	
-.07	.18	.83	.77	.68	75.0	PRWP.17
		-1.1	-1.4	.63	64.3	
-.30	.18	.81	.77	.69	67.0	LPK.9
		-1.3	-1.3	.62	65.1	
-.16	.18	.80	.76	..70	70.0	LPK.6
		-1.4	-1.5	.63	64.5	
.81	.16	.68	.80	.74	65.0	DPRWP.15
		-2.5	-1.4	.68	59.6	
.-.47	.19	.76	.68	.69	78.0	PSP.26
		-1.7	-1.8	.61	66.5	
-.33	.18	.70	.63	.75	73.0	PSP.24
		-2.1	-2.3	.62	65.8	
.09	.18	.65	.66	.73	74.0	LPK.10
		-2.6	-2.3	.64	63.4	
-.40	.19	.61	.55	.76	82.0	PRWP.16
		-3.0	-2.8	.61	66.0	

After deleting the misfit items of the LBTF instrument, the findings of RM analysis showed that all items of LBTF and LTP showed a positive value greater than .20. These results indicated that all items moved in parallel functions to measure the constructs formed. as very good items signifying that all the items are appropriate for both further statistical analysis and inferences. These findings indicated very good items signifying that all the items were appropriate for both further statistical analysis and inferences.

Table 3: Dimensionality analysis results of LBTF

	Empirical			Modeled
Total raw variance I observations	135.2	100.0%		100.0%
Raw variance explained by measures	67.9	50 .0%		49.6%
Raw variance is explained by persons	39.6	29. 1%		28.9%
Raw Variance explained by items	28.3	20. 8%		20.7%
Raw unexplained variance (total)	68.0	50.0%	100.0%	50.4%
Unexplained variance in 1st contrast	6.2	4.6%	9.1%	
Unexplained variance in 2nd contrast	4.3	3.2%	6.4%	
Unexplained variance in 3rd contrast	4.2	3.1%	5.0%	
Unexplained variance in 4th contrast	3.4	2.5%	5.0%	
Unexplained variance in 5th contrast	2.8%	2.1%	4.1%	

The dimension of LBTF and LTP constructs were tested using dimensionality analysis of RM. The dimensionality aspect is important for determining that the instrument is measured in one dimension and one direction (Linacre, 2003; Bond and Fox, 2007). In RM analysis, a satisfactory dimensionality determined by raw variance explained by measures should be more than 40% and

unexplained variance in 1st contrast which should be ≤ 15. Table 3 showed raw variance explained by measures was 50.0%.0%, and unexplained variance in 1st contrast was 4.6%%. Thus, dimensionality data results demonstrate that the LBTF data fit the RM.

The dimensionality analysis results of LTP tested using RM as shown in Table 4. The raw variance explained by measures value was 44.6%.0%, and the unexplained variance in the 1st contrast value was 6.7%%. Thus, dimensionality data results show that the LTP data fit the RM.

Table 4: Dimensionality analysis results of LTP

	Empirical			Modeled
Total raw variance in observations	4.1	100.0%		100.0%
Rawvariance is explained by measures	24.1	44.6%		45.2%
Raw variance is explained by persons	4.7	27.1%		27.5%
Raw Variance explained by items	9.4	17.5%		17.7%
Raw unexplained variance (total)	30.0	55.4%	100.0%	54.8%
Unexplained variance in 1st contrast	3.6	6.7%	12.0%	
Unexplained variance in 2nd contrast	3.0	5.5%	10.0%	
Unexplained variance in 3rd contrast	2.3	4.2%	7.6%	
Unexplained variance in 4th contrast	2.1	3.9%	7.0%	
Unexplained variance in 5th contrast	1.7	3.1%	5.7%	

Table 5: Person reliability and separation index for LBTF

	Raw Score	Count	Measure	Infit		Outfit	
				IMSQ	ZSTD	Omsq	ZSTS
Mean	281.3	68.0	1.85	1.02	-.2	1.04	-.2
S.D	37.8	0.0	1.13	0.51	2.6	0.76	2.6
Real RMSE	0.22						
ADJ. SD	1.11						
Separation	5.00						
Person liability	0.96						
Total person input	103						

Table 6: Items reliability and separation index for LBTF

	Raw Score	Count	Measure	Infit		Outfit	
				IMSQ	ZSTD	OMSQ	ZSTS
Mean	426.1	103.0	0.00	0.98	-0.2	1.04	0.1
S.D	31.2	0.0	0.71	0.28	1.8	0.36	2.1
Real RMSE	0.16						
ADJ. SD	1.11						
Separation	4.20						
Item reliability	0.95						

However, the reliability analysis was tested and conducted with 67 items for LBTF instrument among 103 lecturers of Community College in Yemen. The criteria for accepting reliability in RM is exceeding 0.50 (Linacre, 2007; Bond and Fox, 2007). In addition, acceptable separation should be more than 2 (Fisher, 2007). Rasch's reliability of the items was comparable with Cronbach's alpha (CA). CA is a measure of internal consistency and estimates the reliability of the scale by computing the variance between all possible pairs of items. Data analysis of reliability using RM showed in Tables 5 and 6. The person reliability was very high at a value of 0.96, and the person separation was 5.00, and the item reliability was 0.95, and the item separation was 4.20 which were acceptable. Analysis of the study showed the reliability of 103 respondents with 67 items in these constructs was high to measure the LBTF. Thus, the reliability of item and person for LBTF instrument values were fairly close together and both representing a strong acceptable level.

Table 7: Person separation and reliability analysis of LTP

	Raw Score	Count	Measure	Infit		Outfit	
				IMSQ	ZSTD	OMSQ	ZSTS
Mean	126.9	30	1.93	1.03	-0.2	1.00	-0.3
S.D	15.0	0.0	1.74	0.72	2.5	0.36	2.5
Real RMSE	0.51						
ADJ. SD	1.67						
Separation	3.27						
Person reliability	0.91						

Table 8: Items Separation and reliability analysis of LTP

	Raw Score	Count	Measure	Infit		Outfit	
				IMSQ	ZSTD	OMSQ	ZSTS
Mean	435.6	103.0	0.00	1.99	-0.1	1.00	-0.1
S.D	14.9	0.0	0.46	0.28	1.8	0.36	1.9
Real RMSE	0.19						
ADJ. SD	0.46						
Separation	2.22						
Item reliability	0.83						

Similarly, the RM analysis used to measure the reliability of LTP was tested using RM analysis as illustrated in Table 7and 8. The analysis of reliability showed that the person reliability value was high with 0.91, and the person separation was 3.27. the item reliability value was 0.83 and the item separation value was 2.22. Therefore, the results of person and item reliability and person and item separation for LTP indicated satisfactory readability. Analysis of the study showed the reliability of 103 respondents with 30 items in these constructs was high to measure

the LTP. Thus, the reliability of item and person for LTP instrument values were fairly close together with both representing a strong acceptable level.

SEM Analysis for the relationship of LBTF and LTP

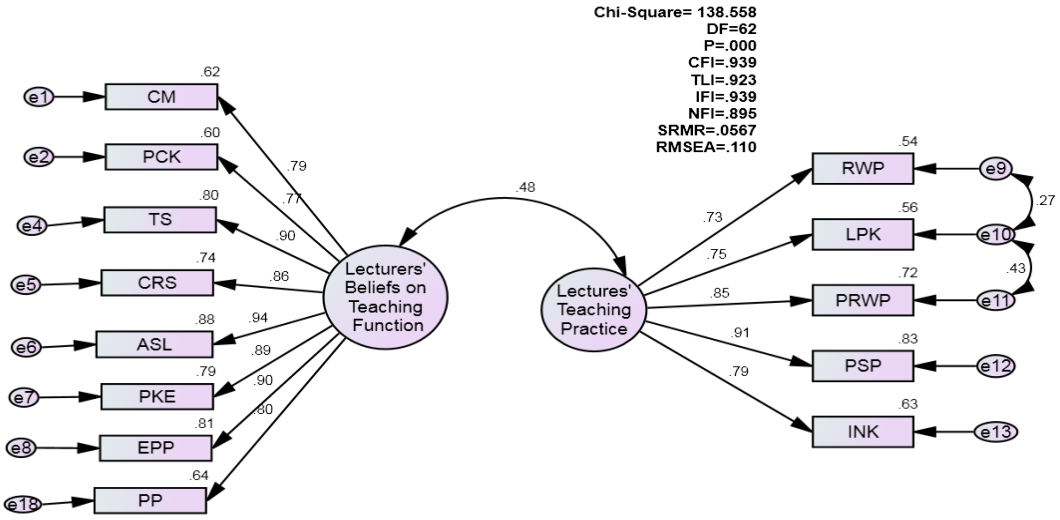

Figure 2: The initial structural model

Because of the need of explaining a fit model, analyzing the initial model was made by calculating estimates of the model. The initial model, as explained in Figure 2, is based on the unidimensionality, validity, and reliability analysis. The unidimensionality was achieved when measuring items having acceptable factor loading equal to or higher than the value of 0.5 for the respective latent construct (Awang, 2012). As shown in Figure 2, construct items had good satisfactory factor loadings hence representing unidimensionality. The validity of the measurement model analyzed the convergent validity, construct validity, and discriminative validity. According to Awang (2012), the convergent validity could be verified through AVE (Average Variance Extracted) and the AVE should be greater or equal to 0.5. The AVE was calculated for the measurement model by calculating the sum of the variance of constructs and then dividing it by the number of constructs of the Lecturers' Beliefs on Teaching Functions (LBTF) and Lecturers' Teaching Practices (LTP). The AVE of LBTF constructs was 0.73, and the AVE of LTP was 0.65. The results of AVE indicated that all items in the measurement model were statistically significant. The discriminative validity of the measurement model was achieved when the measurement model was free from redundant items, or when the correlation between each pair of a latent exogenous construct is less than 0.85 (Awang, 2012). Figure 1 showed the good discriminative validity of the initial measurement model.

Table 9 explained the goodness of fit indexes used to evaluate the initial measurement model. As shown in Table 1, the Chi-square was significant, the value of CFI was value was 0.93, the value of TLI was 0.92, IFI Value was 0.93, NFI value was 0.89, SEMR value was 0.56, RMSEA value was 0.11 and Chi-square/df value was 2.23. The values of Chi-square, CFI, TLI, NFI, and Chi-square/df showed acceptable goodness fit of measurement. However, the goodness fit indexes of NFI was 0.89, SRMR was 0.56 and the RMSE was 0.11 which showed low goodness fit. Therefore, the initial measurement model needed modification. There is a series of the goodness of fit indices that reflect the fitness of the model. It was recommended to use at least three fit indexes by including at least one index from each category of model fit (Norris, 2005; Garson, 2009; Awang, 2012).

Table 9: The index category and level of acceptance for every index

Name of category	Name of index	Level of acceptance	Index Level results
Absolute fit	Chisq	P > 0.05	Significant
	RMSE	RMSE < 0.08	0.11
Incremental fit	CFI	CFI > 0.90	0.93
	TLI	TLI > 0.90	0.92
	NFI	NFI > 0.90	0.89
Parsimonious fit	Chis/df	Chis/df < 5.0	2.23

Table 10: Summary of improved index category of a modified model

Name of category	**Name of index**	**Index in the initial model**	**Indexes in the proposed model**
Absolute fit	ChiSq	Significant	Significant
	RMSE	0.11*	0.076*
Incremental fit	CFI	0.93	0.97
	TLI	0.92	0.96
	NFI	0.89*	0.93*
Parsimonious fit	Chisq/df	Chisq/df 1 = 2.23 < 5.0	Chisq/df = 1.58 < 5.0

Modification indices were used to improve model fitness (Garson, 2009). However, modification needed to be consistent with the theory used to propose the model. Figure 3 and Table 10 depicted a new measurement model. In the modification model, the best-fit indices of the proposed measurement model were improved and showed good fit as showed in Figure 3 and Table 2. However, CVA was used to answer the research question "Is there a significant relationship between LBTF and LTP?" As shown in Table 11, the estimate (correlation) value between lecturers'' teaching and practices were 0.48, and the probability of getting a critical ratio as large as 3.69 in absolute value was less than 0.001. In other words, the correlation between

LBTF and LTP was significantly different from zero at the 0.001 level (two-tailed) and it was greater than 0.25.

Table 11: The estimated results of LBTF and LTP

			Estimate	S.E.	C.R.	P	Label
LBTF	<-->	LTP	1.017	0.48	3.694	***	

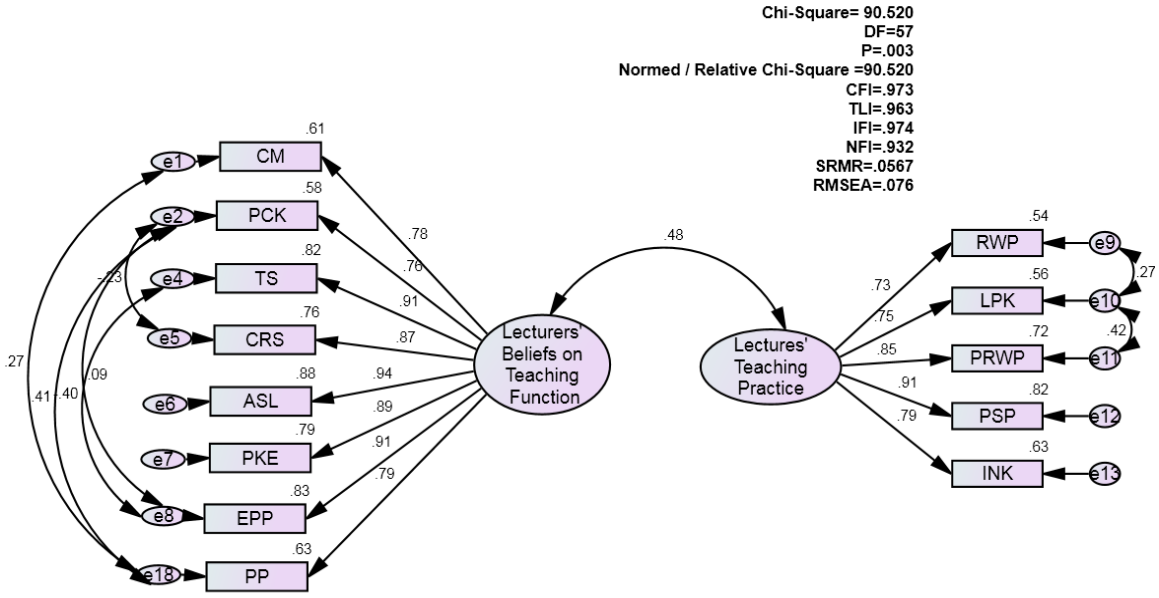

Figure 3: The modified model

Discussion

An understanding of the relationship between Lecturers' Beliefs on Teaching Functions (LBTF) and Lecturers' Teaching Practices (LTP) is important for the improvement of lecturers' professional development. Hence, the findings of the modified model showed the best-fit indices of the proposed measurement model were improved and showed good goodness of fit. This result showed a good fit of the proposed model. In addition, the results of AVE of the CVA measurement model showed that all items in the CVA measurement model were statistically significant. The research question was answered by CVA. The findings showed that there was a

good and significant correlation between lecturers' beliefs on teaching and practices. This result implied that such changes in lecturers' beliefs on teaching functions will lead to specific changes in their classroom behaviors and practices. The lecturers' beliefs on teaching are platforms that guide their teaching activities and practices. Thus, lecturers with a high belief in teacher functions have higher teaching practices than those with low belief in teaching functions.

Understanding the beliefs of lecturers is critical in education as we 'cannot effect change in lecturers' behaviors without also effecting change in their personal beliefs' (Kagan, 1992). Findings of this study showed that beliefs may affect the lecturers' practices and therefore better professional development as an explanation of how lecturers' beliefs and ideas influence how they conceptualize teaching. Pajares (1992) states that beliefs function as a filter through which new phenomena are interpreted. Lecturers make decisions about classroom instruction in the light that theoretical beliefs have on teaching and learning (Harste and Burke, 1977). Thus, lecturers' beliefs affect their objectives, procedures, materials, interaction patterns of the classroom, their teaching functions, their students, and the institutions where they work. However, Schommer (1994) suggests that epistemological beliefs evolve with experience, reflecting experiences of both education and home-life and that there is scope for change.

Professional competence is believed to be a crucial factor in the classroom and educational institution practices (Shulman, 1987; Campbell et al., 2004; Campbell and Norton, 2007; OECD, 2009; Guskey, 2012). The findings of this study indicated that lecturers with high belief in teacher functions have higher teaching practices than those with low belief in teaching functions. As a result of that, the professional development of lecturers can be enhanced when their teaching practices are high as a result of high belief in teaching functions. Because the need of lecturers to improve their professionalism through changing some beliefs which may affect their teaching practices that lead to improving their professionalism. Thus, professional development of lecturers could be through training internationalization designed to improve their performance in the light of competencies, and building on this proposal can prepare competency-based training for the development of some of the teaching skills of faculty members according to the self-learning model. Savasci-Acikalin (2009) reached a similar result that lecturers' beliefs are consistent with classroom practices. The findings of Mansour (2008) study suggested that lecturers' personal religious beliefs and experiences played a significant role in shaping beliefs and practices. Al-Jadidi (2012) concluded in her study of Professional Preparation, Knowledge and Beliefs of Kindergarten Lecturers in Saudi Arabia that the activities the children are involved in are related to their culture and families and are in keeping with their experience of Islam and their religious beliefs. In addition, Watson (2012) in his research concluded that beliefs are related to pedagogical practices. Therefore, it can be concluded that beliefs and experience shape lecturers' teaching which influences their teaching practices that reflect lecturers' professionalism. Alwadi and Saravanan (2014) in their research found that although teachers showed earlier resistance to change their epistemological beliefs and professional practices, they

became keener to improve their practices and adopt suggestions by the end of their program. Naashia-Mohamed (2006) concluded in her study that there was an interconnection between teachers' beliefs, their instructional practices, and professional development.

In summary, the previous studies found that lecturers' beliefs are mostly consistent with their practices. (Savasci-andAcikalin, 2009; Thompson, 1992; Yero, 2002). The research findings of SEM conclude that the influence of these different sets of variables lecturers' beliefs on teaching functions as an independent variable and lecturers' teaching practices as the dependent variable was tested. Thus, the effective evaluating of lecturers' beliefs and understandings of teaching as well as learning play an important role in their classroom practices and their professional growth and improvement of the effectiveness of teaching in colleges and universities (Naashia-Mohamed, 2006; Kuzborska, 2011; Strong 2003; Hiadar, 2009; Al-Jadidi, 2012; Mofreh, 2018).

Implications

This study is unique in combining a tight focus on Lecturers' Beliefs on Teaching Functions (LBTF) and Lecturers' Teaching Practices (LTP) involvement of lecturers at community colleges using mixed methods. This study provides important insights for lecturers, community colleges, higher educational institutions, policymakers in higher education, and students regardless of the relationship between LBTF and LTP. More importantly, a study of LBTF and LTP can create a picture of how the findings and recommendations of current research and policy filter through into real classroom practices, showing how lecturers view 'practices' policy through the lens of their belief on teaching functions. Currently, there is no instrument measuring the Lecturers' Beliefs on Teaching Functions (LBTF) and Lecturers' Teaching Practices (LTP). This research developed the LBTF and LTP as its first contribution.

This study will help the lecturers to understand how their ideas and perceptions about their roles and responsibilities can improve their professionalism and practices in teaching. Lecturers' understanding of the importance of their beliefs gives them the opportunity in decision-making and improvement of students' achievements. Kennedy (1997) asserts that these beliefs are used to evaluate the new ideas about teaching that lecturers confront in their classes. Those teachings that square with their beliefs are recognized and characterized as "what's new?" Using the developed LBTF questionnaire, the lecturers can measure their Beliefs in Teaching Functions. Using the developed LTP questionnaire, the lecturers can measure their Teaching practices. Understanding the relationship between Lecturers' Beliefs on Teaching Functions (LBTF) and Lecturers' Teaching Practices (LTP) provides lecturers with possible examples of how their beliefs influence their classroom practices.

The administrative community colleges can use the developed LBTF instrument to measure the lecturers' beliefs on teaching functions and LTP instrument is used to measure teaching practices among lecturers at community colleges. The administrative in community colleges can assess the lecturers' professional development individually based on their beliefs on teaching functions and their influence on their teaching practices.

Those teachings that square with their beliefs are recognized and characterized as "what is new?" Thus, the relationship between beliefs and practices among lecturers should be considered among scholars. Also, it is useful to provide lecturers with possible examples of how to apply promoted ideas and resolve conflicts among a variety of beliefs, organizational supports and constraints, and related practices. In addition, it helps lecturers to adapt to educational reform, the process of reflecting on and discussing beliefs is "an important aspect of lecturers' professional development," enabling lecturers to take "greater control over their professional growth" (Calderhead 1996; (OECD, 2009; Guskey, 2010; Shagrir, 2013, Mofreh, 2018). Such reflection may even be a route to improving classroom practice, as Salinas et al. (2002) argued: "enhancing lecturers' consciousness of their beliefs about classroom practice should contribute to improving effectiveness".

However, this research with its contribution gives the key to community colleges on how to accomplish its goals by developing the CC lecturers' practices. Therefore, this CC can appraise lecturers' teaching practices by using self-assessment based on the lecturers' perceptions and beliefs about their teaching functions which influence lecturers' in their understanding of their roles as lecturers because of building their new knowledge and experiences. In addition, the CC lecturers with their beliefs of teaching functions will develop their teaching practices. This new vision of the importance of the role of lecturers' beliefs on teaching functions and its influence on teaching practices gives CC administrations and lecturers the light of impertinence role that lecturers can play in improving the effectiveness of teaching. Like any educational institution, the effectiveness and success of a CC depend on effective lecturers and their roles in education that are the most important resources, which influence the CC outcomes. Thus, community colleges could use both LBTF and LTP instruments in appraising lecturers as a supportive and developmental process designed to ensure that all lecturers have the skills and support they need to carry out their roles effectively. It will help to ensure that lecturers can continue to improve their professional practice and develop as lecturers.

Other higher institutes in Yemen like universities and colleges may rethink lecturers as an important source in raising their effectiveness by understanding the beliefs and perceptions about their teaching and how these beliefs influence their teaching practices, student s' achievements, and college outcomes.

For policy-makers, the research explores the relationship between the demands made in the LBTF and LTP model and framework, showing alignments and points of tension. It offers insights into how a decade of the framework has shaped lecturers' beliefs and practice as factor indicators of their professional development.

Recommendations

Research in the future could consider other factors which may affect the relationship between LBTF and LTP. These factors may include the role of culture, religion, work overload, time restraints, and problems with student behavior, working conditions, relationships with colleagues, lack of resources, and the physical demands of teaching. A full SEM for further future research is essential to expand the theory guiding this phenomenon. Finally, future research can use a larger sample employing accurate statistical findings on using SEM to further investigate the effects among variables. This study is to test the model of LBTF and LTP as future research.

Conclusion

An understanding of the relationship between lecturers' beliefs on teaching and practices is important for the improvement of lecturers' professional development. In this study, the measurement model, therefore, provides an integrated model of teaching functions and practices. Findings of the modified model showed the best-fit indices of the proposed measurement model were improved and showed good goodness of fit. The proposed hierarchical model is made up of two levels with lecturers' beliefs on teaching construct variables being the first level while the teaching practices constructs make up the second level. Therefore, this model provides conceptual background for future analysis of beliefs on teaching functions and practices in community colleges. The relationship between lecturers' beliefs on teaching functions and teaching practices was tested using SEM.

The proposed measurement model could be implied to predict a model for the relationship between lecturers' beliefs on teaching and practices and the effects of the lecturers' beliefs on teaching on practices. This result implied that such changes in lecturers' beliefs on teaching functions will lead to specific changes in their classroom behaviors and practices. The lecturers' beliefs on teaching functions could be used as platforms that guide their teaching activities and practices. Therefore, the developed LBTF and LTP instruments could be used as measurable instruments to measure their beliefs and predict their improvement in practices as an indicator of their professional development.

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