

# *Assessing the Pedagogical Competencies of Affiliated B-School Faculty Members Using Principal Component Analysis*

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**Abstract**— The aim of this research paper was to assess the pedagogical competencies of management faculty members with reference to permanent faculty members working in University affiliated B-Schools in urban Bengaluru. The literature review helped in identifying 41 pedagogical competencies. A quantitative, exploratory, descriptive cross-sectional survey research design method was used in the study to analyze the competencies of B-School faculty members. A structured self administered survey questionnaire with five point Likert rating scale was developed for data collection. After satisfying the tests of reliability the data was subjected to Principal Component Analysis (PCA) and resulted in the identification of ten pedagogical competencies. They were named on the basis of their interrelationship within each component.

**Keywords**- *management education, pedagogical competency, professional knowledge, skills, factor analysis.*

## I. INTRODUCTION

Higher education has long been recognized as a major contributing factor to the social, cultural and intellectual life of society by improving the quality of human life (Shetty, P.K., Hiremath, M. B., Murugan, M., and Sreeja, K. G 2010). While primary and secondary education is concerned with transfer of knowledge from teacher to student, higher education includes analysis, synthesis and the transformation of information into knowledge. Teachers in higher education are involved not only in teaching, but also in research and discussion (Manivannan & Premila, 2009).

According to Agarwal (2010), the three pillars of any higher education institution are: quality of faculty, infrastructure and learning environment. Thus quality in higher education has become a necessary condition for the knowledge transfer, knowledge creation and knowledge services to the society (Tripathi et al 2010).

Fluctuations that have occurred due to the increasing needs of expanding access to higher education, impact of technology on the delivery of education, increasing private participation and the impact of globalization has initiated the need for change in the Indian education system (NAAC, 2004). Faculty members in the field of Business Management need to develop new teaching methodologies to manage the dynamism of the business world. Management teacher's competencies have to be seen as a holistic integrated model that takes into

account seven integrated modules: pedagogical competence, interaction competence, innovative and research competence, networking competence and the teacher's profession (Amok, 2007; Malik, 2010).

Today management education has entered a period of profound transition driven by technology, demographics and pressing social imperatives. Business schools need to reposition themselves to leverage the present wave of change in business (Mamun & Mohammed, 2009). Teacher's role in higher education is vast and quality based teaching is the biggest challenge before the higher education system. In addition to this, teaching needs to be supported by research, experimentation and innovation (Rymbai, 2011). Therefore, faculty needs to analyse and upgrade their skills and attitudes to be able to provide students with the necessary skills and talents to help them accept the challenges and compete of the market place.

## II. LITERATURE REVIEW

Traditionally the role of management educators has been viewed as one of dissemination of knowledge to students (McEvoy et. al, 2005). With the emerging environmental challenges, teaching profession has become very challenging. The role of a faculty member is no more knowledge transferring process; it has become a knowledge sharing process (Tripathi & Suri, 2010).

Today, teaching is a complex activity with vast operational area and it relies on clearly defined set of competencies possessed by professionals working in this field (Bhargava & Pathy, 2011). Competent teachers are an asset to the nation's education system. Oza and Parab (2012), states that the three pillars of management education depends on the combined efforts on the part of the education system as a whole, the educational institutions and the faculties.

According to Whitty (1996), the qualities of a professional teacher comprise professional characteristics (includes professional values, personal and professional development, communication and relationship as well as synthesis and application) and professional competences (includes knowledge and understanding of students and their

learning, subject knowledge, education system and teacher's role).

Literature on teaching contains a lot of extensive work by researchers like Ryans (1960) identified 300 teachers' characteristics, subject matter, adequate preparation and enthusiasm (Horngren 1963); analytic/synthetic approach of teachers, well organized, teacher-group interaction, teacher individual student interaction and dynamism/enthusiasm manner (Eble 1971). Subject knowledge (Sheffield 1974; Grunerwald & Ackerman 1986), lectures and instructions orderly prepared planned (Sheffield 1974), subject related to life or practical, encouraging questions (Sheffield 1974; Conant et al 1988; Kelley et al 1991) and opinions from students (Sheffield 1974; Suydam 1983), enthusiasm about teaching, approachable/friendly/available, concern for students progress, has a sense of humour/amusing, warm/kind/ sympathetic and effective use of teaching aids (Sheffield 1974) are some of the characteristics related to effective teaching skills. In higher education providing skilled explanation, demonstrate concern and respect for students and student learning, providing appropriate assessment and feedback, ensuring that students are given clear goals and intellectual challenge (Ramsden, 1992) improves student learning methodology and involvement (Gurney 2007). The factors needed on the part of the faculty include willingness to face challenges, learner – centric education, consultancy competency, ability to compete, accountability, feedback culture, commitment towards duty, counselling, creativity and innovation, self-awareness, interpersonal skills, facilitator, self confidence, motivational power, ability to assess, presentation skills, comprehensive skills, adaptability, perseverance, responsiveness and intention to enrich knowledge (Oza and Parab 2012).

Academic competence is usually evidenced in higher education institutions based on qualifications held (e.g. PhD) together with current research output and staff development activities such as seminars and conferences. In light of such a proposition, good lecturers must be experts on content knowledge, have thorough knowledge of their subject and of new developments in their field and be capable of using relevant information from specific literature for their own teaching (Badley 2000).

In a research paper presented by Martinazzi and Samples (2000), demonstrating competencies of effective professors include 'possessing adequate academic and professional credentials, application of subject matter to real life situations, good command of subject matter, ability to use examples from a variety of sources to support teaching, active involvement in consulting and continuing education, maintaining relationship with academic and professional colleagues by participating in various activities'.

Roberts et. al (2006) concluded in their study that teachers' competencies include 'instruction knowledge - content knowledge, context knowledge; instruction skills – teaching skills, ability to motivate students, mentoring and multi-tasking, preparing students for competitive events and activities, actively supervising student projects'. Personal traits include 'caring, being motivated, enthusiasm, self confidence,

honest/moral/ethical, responsible, creative, patient and interpersonal skills'.

Wang Yi (2006) indicated that the competencies of the college teachers consist of the logic thinking, relationship establishment, achievement orientation, personal relationship, information retrieval, responsibility, creation and innovation. Zhang Yiyuan, Ma Jianhui (2006) indicated that the competencies of the lecturers in the higher vocational college should include professional competency (professional knowledge and skills), psychological competency (achievement orientation, initiation, adaptability, cooperation, vocational ethics, responsibility and organizational loyalty), and performance pattern competency (influence, consultation, personal relationship).

Liakopoulou (2011), aimed to identify factors that were essential for teachers to successfully perform their pedagogical and didactic duties. Personality traits identified were 'love for profession, responsibility, humour, commitment, desire for improvement, patience, enthusiasm'. Knowledge included 'preparation and planning of teaching, use of appropriate forms of teaching methods and aids, use of technology, evaluation techniques, curriculum and use of teaching material'. Understanding learners/students consisted of 'motivation and encouraging learning, understanding student need and adjusting teaching accordingly'. Pedagogical content knowledge comprised of interdisciplinary approach to subject, emphasizing subject content to real life'.

### III. NEED FOR THE STUDY

Tertiary education system is the backbone of a country's sustainable development and the quality of an education system depends on the knowledge and professionals skills of teachers. Therefore teachers are an integral component of the success of an education system. (Huberman, 2005). Through four missions, higher education system have contributed to the country's social and economic development namely: formation of human capital through teaching; building of knowledge base – primarily through research related activities; utilization and dissemination of knowledge through interaction with users and upholding, preservation and transmission of knowledge (Bradley, 2008).

While the old system of education is more theoretical based, with focus on rearrangement of knowledge, content based activity, more related to acquisition of information, assessment is based on knowledge, collective and generalized curriculum, is dependent on traditional methods of teaching and the focus is very narrow. The new system is based on practical foundation with focus on creation of knowledge and need based activities; future knowledge that is skill based involving application of knowledge that is based on what learners need to know to meet modern demands. New system uses a combination of modern and new methods of teaching, methodology, includes more of curricular and co-curricular activities and the focus is broad and globalised (Adeeb et. al).

With India trying to position itself as a knowledge driven economy, higher education needs to cater to the skills requirement across the globe. The last ten years has seen the

mushrooming of higher educational institutions, student enrollment has increased, and many private institutions have entered to provide services. This era also witnessed management students being unemployable for a variety of reasons – rejected by recruiters, employed for non-managerial jobs, low paying jobs etc. (Guntuk & Meesala, 2013).

Thus the challenge that arises out of this situation is to have an educational approach that is more practical and industry driven. Under these circumstances it is essential to identify the latent factors of the pedagogical competencies of B-School.

IV. OBJECTIVE OF THE STUDY

The main objective of this study is to determine the key factors of pedagogical competencies of B- School Faculty members in urban Bengaluru.

V. RESEARCH METHODOLOGY

The literature review helped in identifying 41 pedagogical competencies. A structured self administered survey questionnaire was developed for data collection. The items in the questionnaire were rated on a five point Likert scale

A. Participants

The respondents in the present study consisted of male and female B-School faculty members in the designation of assistant professor, associate professor and professor working in University affiliated colleges and institutions in urban Bengaluru.

B. Sampling

In this study simple random sampling without replacement using Tippett’s random number table was used for sample selection. To systematically and randomly select the sample, the colleges were arranged in alphabetical order, using Tippett’s random number table 47 colleges were selected from the 117 colleges in urban Bengaluru with the intent of identifying a sample of 500 teachers. Of the 500 questionnaires distributed among the 47 colleges, 441 were received and 28 questionnaires were discarded as they were incomplete.

C. Data Collection

Of the 500 questionnaires that were distributed, 441 were received and 28 questionnaires were discarded as they were incomplete and 413 questionnaires were coded and analyzed using Statistical Package for Social Sciences (SPSS) tool, version 20.

VI. DATA ANALYSIS

A. Reliability Test

Cronbach’s alpha ( $\alpha$ ) is the most common measure of internal consistency ‘reliability’. It is most commonly used when multiple Likert questions in a survey questionnaire form a scale and the reliability needs to be determined.

TABLE I. RELIABILITY TEST - CRONBACH’S ALPHA

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.790	.814	41

The reliability statistics provides the actual value for Cronbach’s alpha for 41 items devised in the questionnaire. The Cronbach’s alpha of 0.790 indicated an overall reliability of internal consistency of the research instrument for factor analysis.

B. Demographic Profile

The demographic profile of the respondents (table 4.1) indicate that 44.3% of the respondents belong to the age group of 25 to 35 years of age; 42.6% of the respondents belong to the age group of 36 to 45 years while 11.6% of the respondents belong to the age group of 46 – 55 years and 1.5% belong to the age group of 56 to 65 years of age. Majority of the respondents (60.8%) are male and 39.2% of the respondents are female. More than half (55.7%) of the respondents are post graduates (MBA holders), 14% of the respondents have completed their Masters in Philosophy (M.Phil.) and 30.3% of the respondents are Doctorates (PhD). The designation of more than half (60%) of the respondents are of Assistant Professors, 20.6% of the respondents are Associate Professors and 19.4% of the respondents are Professors. Majority of the respondents (78.5%) are not UGC/NET/SLET qualified while only 21.5% of the respondents are UGC/NET/SLET qualified. 23.5% of the respondents completed their doctorate (PhD) after joining teaching profession and 11.8% completed their Masters in Philosophy (M.Phil.) after joining teaching. While 24.9% of the respondents are presently pursuing their PhD, only three professors (0.7%) are pursuing their post doctorate.

C. Factor Analysis

Factor analysis is a popular method widely used to determine the underlying factors among a large number of interdependent variables or measures. It is a statistical technique to extract common factor variance from a set of observations. It is useful in finding clusters of related variables and is ideal when reducing variables into an understandable framework (Field, 2005).

TABLE II. KMO AND BARLETT’S TEST

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.721
Bartlett's Test of Sphericity	Approx. Chi-Square	7333.966
	df	820
	Sig.	.000

The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (Table II) yielded a value of 0.721 suggesting the suitability of the sample size for factor analysis and Bartlett’s

test of sphericity conducted to establish the reliability and validity was also significant. Prior to principal component analysis, the communalities were established. Communality explains the total amount an original variable shares with all the other variables included in the analysis and is useful in deciding which variables to finally extract (Bakhrū et. al. 2013).

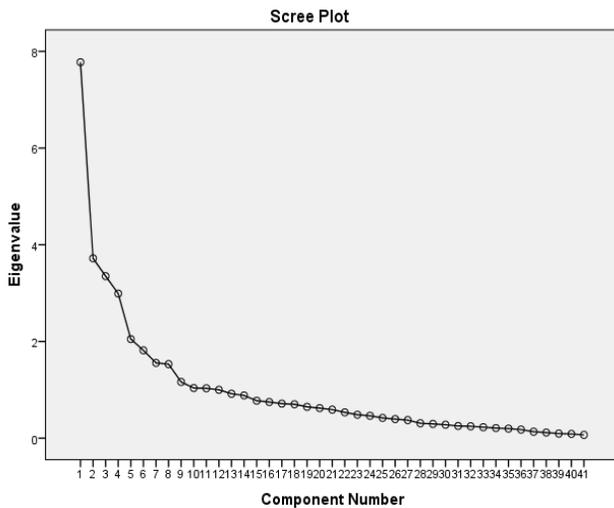


Figure 1. Scree plot of the pedagogical competencies of B-School faculty members

The scree plot (Figure 1) identified twelve components with eigen value more than 1 and accounted for almost 70.79% of the variability in the original variable. The conventional rule about communality values is that eigen value of more than 0.50 from the initial iteration indicate that the variables are significant and should be included in the analysis (Field, 2005). The last two factors had single variables and could not be linked to the other factors and hence were dropped from the analysis.

**TABLE III. FACTOR ANALYSIS OF THE PEDAGOGICAL COMPETENCIES OF B-SCHOOL FACULTY MEMBERS**

Factor	Attributes	Loading	Factor Name
1	Incorporate contemporary issues into the lessons	.840	Content knowledge
	Knowledge is based on referring research journals	.719	
	Use extra material to meet changing demands	.643	
	Upgrade the basic content with new information	.636	
	Allow the students to interact while teaching	.605	

	Plan teaching on the basis of students response to learning	.553	
2	Discuss students' performance to assist their progress	.739	Knowledge about learners
	Discuss students social/educational background to assist their progress	.669	
	Use of assessment and feedback to meet learning objectives of students	.658	
	Discuss students' personal problems with students to help their growth	.647	
	Ability to link knowledge of other fields to make teaching effective	.633	
	Use different teaching methods to facilitate learning	.563	
	Integrate subject matter with real life situation	.536	
3	Ability to clear students' doubts on the basis of knowledge	.894	Context knowledge
	Use analogies, diagrams, pictures to make subject interesting	.892	
	Help integrate knowledge with modern demands	.860	
4	Knowledge is based on referring textbooks	.729	Subject knowledge
	Keep track of students' academic performance	.678	
	Follow the basic prescribed content of the curriculum	.598	
5	Ability to build rapport with students	.735	Interpersonal skills
	Preference to interact with all	.705	
	Use a variety of communication techniques to initiate student participation	.660	
	Ability to understand students needs	.650	
6	Aim at completion of syllabus	.824	Teaching skills
	Providing clear directions on subject content	.749	
	Allow student clarification during teaching	.772	
	Explanation to facilitate student learning	.696	

7	Use ICT in instructions	.854	Technological skills
	Use technology in networking/collaborating	.750	
	Use ICT tools in teaching	.735	
	Use technological devices in teaching	.649	
8	Ability to use different teaching methods	.814	Class Management skills
	Planning & structuring contents for teaching	.795	
	Organize content to serve learning needs	.714	
9	Use variety of communication styles	.818	Communication Skills
	Adapt content to suit students understanding capacity	.788	
	Ability to interpret complex ideas/concepts in simple form	.512	
10	Linking teaching with research	.719	R & D Skills
	Use ICT in researching	.713	

## VII. DISCUSSION OF RESULTS

The principal component analysis (Table III) resulted in the extraction of ten factors. These factors are referred to as dimensions of management teaching pedagogical competency in the further analysis. On the basis of the interrelated relationship present among the variables under each component their names were devised as follows:

**Factor 1 – Content knowledge:** consisted of six variables: incorporate contemporary issues into the lessons (.840); knowledge is based on referring research journals (.719); use extra material to meet changing demands (.643); upgrade the basic content with new information (.636); allow the students to interact while teaching (.605); plan teaching on the basis of students response to learning (.553).

**Factor 2 – Knowledge about learners:** included seven variables: discuss students' performance to assist their progress (.739); discuss students social/educational background to assist their progress (.669); use of assessment and feedback to meet learning objectives of students (.658); discuss students' personal problems with students to help their growth (.647); ability to link knowledge of other fields to make teaching effective (.633); use different teaching methods to facilitate learning (.563); integrate subject matter with real life situation (.536).

**Factor 3 – Context knowledge:** comprised of three variables: ability to clear students' doubts on the basis of knowledge (.894); use analogies, diagrams, pictures to make subject interesting (.892); and Help integrate knowledge with modern demands (.860).

**Factor 4 – Subject knowledge:** included the following: knowledge is based on referring textbooks (.729); keep track of

students' academic performance (.678) and follow the basic prescribed content of the curriculum (.598).

**Factor 5: Interpersonal skills** – consisted of five factors: build rapport with students (.735); ability to interact with all (.705); use a variety of communication techniques to initiate student participation (.660); prefer to work with students interest in mind (.650).

**Factor 6: Teaching skills** – comprised of five factors: completion of syllabus (.824); providing clear instructions on subject content (.749); facilitate student understanding (.696); allow student clarification during teaching (.722).

**Factor 7: Technological skills** – consisted of four factors: use ICT in instructions (.854); use technology in networking/collaborating (.750); use ICT tools in teaching (.735); Use technological devices in teaching (.649).

**Factor 8: Class management skills** – comprised of three factors: ability to use different teaching methods (.814); planning & structuring contents for teaching (.795); organize content to serve learning needs (.714).

**Factor 9: Communication skills** – included the following: use variety of communication styles (.818); adapt content to suit students understanding capacity (.788); ability to interpret complex ideas/concepts in simple form (.512).

**Factor 10: R & D skills** – include link teaching with research (.719) and use ICT in research (.713).

## VIII. CONCLUSION

The study has helped in identifying the attributes of pedagogical competencies and has helped in consolidating the components and also in understanding the relationships within the variables of pedagogical competency. In this study 41 competencies have been compressed into 10 competency areas of pedagogical competency with reference to management teaching. Pedagogical competency is composed professional knowledge and skills and successful teaching depends on in-depth subject knowledge, linking knowledge of theory and research to teaching and learning, and simultaneously using knowledge and skills in a rationale context. This framework of pedagogical competency can be a guide in planning of teaching and can also form a basis for evaluation of performance, recruitment and for training purposes in management teaching.

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