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Principal Components Analysis of Teachers Employee Engagement using SPSS

Dr. Vivekanand Ankush Pawar*
Dean, MBA (Executive), Pillai Institute of Management Studies and Research, New Panvel, Navi Mumbai – 410206.

Abstract: *Research shows that the employee engagement is intellectual and emotional involvement which incorporates the head, heart and hands of employee, put forth the amount of discretionary effort, shows enthusiasm for the job and willingness to help the organization achieve its goals.*
In today's world there is neck-to-neck competitive in higher education and the role of engaged teachers in this respect is undisputable. An engaged teacher will show a high degree of commitment and involvement in the profession. For him/her teaching is more of commitment than compliance (Barman A. and Saikat R., 2011). The teachers in higher education sector should be fully engaged, so that quality teaching can be imparted to the students. Thus, engagement of the teachers is an important consideration for all the higher educational institutions.
This research paper aims to determine the principal components of the latent variables (independent and the dependent variables) of the Teachers Employee Engagement Model using SPSS.
Key Words: *Employee Engagement, Higher Education, Principal Components Analysis*

I. Introduction

Employee engagement has received a great deal of attention in the last two decades in the popular business press and among consulting firms and the practitioner community. Research shows that the employee engagement is intellectual and emotional involvement which incorporates the head, heart and hands of employee, put forth the amount of discretionary effort, shows enthusiasm for the job and willingness to help the organization achieve its goals. Employee engagement is a critical ingredient of individual and organizational success. Engaged employees exhibit innovative behaviours. Innovative behaviours reflect the creation of something new or different. Innovative behaviours are by definition change-oriented, because they involve the creation of a new product, service, idea, procedure, or process. Employee engagement is the extent to which employees commit rationally and emotionally. The commitment of an employee to the company is indicated through the behaviours which employee has good things to say about the company and has a strong desire to continue working for the company. Employee is willing to exert extra effort and dedication to the company's business success.

The fast developing nations have given rightful political priorities to develop human capital through education. The students of developing countries understand well that quality higher education is the only way if they want to climb up to the developed status (Shukla A. and Trivedi.T, 2008). High quality teaching is one of the major challenges faces by higher education sector in India. In today's world there is neck-to-neck competitive in higher education and the role of engaged teachers in this respect is undisputable. An engaged teacher will show a high degree of commitment and involvement in the profession. For him/her teaching is more of commitment than compliance (Barman A. and Saikat R., 2011). The teachers in higher education sector should be fully engaged, so that quality teaching can be imparted to the students. Thus, engagement of the teachers is an important consideration for all the higher educational institutions.

II. Review of Literature

Employee Engagement

Kahn (1990) defined employee engagement with work as "the harnessing of organizational members' selves to their work roles; in engagement, people employ and express themselves physically, cognitively, and emotionally during role performances"(p. 694).

A stronger theoretical rationale for explaining employee engagement is found in social exchange theory (SET). SET provides a theoretical foundation to explain why employees to become more or less engaged in their work and organization. Engagement is the degree to which an individual is attenuate and absorbed in the performance of their roles (Saks, 2006).

BlessingWhite's engagement model focuses on an individual's contribution to the company's success

and the personal satisfaction in the role. They believe that aligning employees' values, goals and aspirations with those of the company is the best methods for achieving sustainable improvements in employee engagement that will help the organization reach its stated goals. Employee's Engagement is a positive, fulfilling work-related state of mind that is characterized by vigor, dedication, and absorption (Taipale, Selander and Anttila, 2011).

Self-Efficacy

According to Bandura (1986,1987) and applied to the workplace by Stajkovic and Luthans (1998a), self-efficacy refers to an individual's beliefs about his or her abilities to mobilize cognitive resources and courses of action needed to successfully execute a specific task with a given context. Importantly from a management development perspective, self-efficacy is state-like and dynamic; it can change over time with new information, experience and learning. That is, self-efficacy is adaptable to human resource development and management for performance improvement.

Rewards and Recognition

Given the two-factor theory, **Intrinsic Rewards** refer to positively valued work outcomes that an employee receives directly as a result of performing of his/her role; they are inherent, not given by external sources like company or other people (Kalleberg, 1977; Schermerhorn et al., 2004). Included in this category are feelings of achievement and self-fulfillment after accomplishing a particularly challenging and/or meaningful task; Herzberg (1959) referred to these and related feelings as motivating factors (Gupta, 1975; Porter & Lawler, 1968).

According to Herzberg's (1959) two-factor theory there are two distinct, independent sets of factors: motivating factors (or motivators) and hygiene factors (or hygiene). More specifically, the theory proposes that motivating factors are typically **intrinsic** to a job; such motivators as personal achievement, recognition for accomplishment, increased responsibility, creative and challenging work and growth opportunity are primary determinants of job satisfaction.

On the other hand, hygiene factors (or hygiene) are typically **extrinsic**; like company policy and administration, supervision, salary, status, security, interpersonal relations, and working conditions (Herzberg et al., 1959).

Recognition is also a strong motivator, because it is a normal human need to long for. Dubrin *et al.* (2004) states that '*motivating others by giving them recognition and praise can be considered a direct application of positive reinforcement*'.

A key focus of recognition is to make employees feel appreciated and valued (Sarvadi, 2005). Research has proven that employees who get recognised tend to have higher self-esteem, more confidence, more willingness to take on new challenges and more eagerness to be innovative (Mason, 2001).

Job Involvement

Lodahl & Kejner (1965) define job involvement as "the degree to which a person's work performance affects his self-esteem". They also argue that employees who are highly concerned with their jobs also reveal high involvement in their organizations. Kanungo (1982) identified different explanation of job involvement while studying the relationship of job involvement to numerous variables, including job characteristics, performance, turnover, and absenteeism.

Lawler & Hall (1970) defined job involvement as the level of importance of one's job to one's personality, which is consistent with Lodahl and Kejner (1965). On the other hand, Bass (1965) considered job involvement as the level to which an individual is vigorously participating in his or her job. However, Etzioni (1975) projected three types of involvement: moral, calculative and alienative. He is of the view that individuals are morally involved, if they own the organizational goals. Blau & Boal (1987) stated that job involvement is the measure of extent to which a person recognizes psychologically with his or her job and mull over his or her job.

Job- involvement is the degree to which one is cognitively preoccupied with, engaged in and concerned with one's present job (Paullay, et al., 1994) Job - involvement is shown to be related organizational citizenship behavior and job - performance (Diefendorff, Brown, Kamin and Lord, 2002) Wellins and Concelman (2004) have included job - involvement as a part of engagement. Engagement is closely associated with constructs of job – involvement. (Brown, 1996) Job-involvement is defined as the degree to which a job is central to the

person and his or her identity. (Lawler and Hall, 1970) Kanungo (1982) suggested that job- involvement is a cognitive state of psychological identification. Job - involvement depends on need saliency and potential of a job to satisfy those needs. Unlike involvement engagement involves active use of emotions, cognitions and behaviors. At a casual level, job involvement as a construct clearly occupies a portion of the conceptual space labeled state engagement. Indeed, as indicated earlier, Harter et al. (2002) specifically equated engagement with both satisfaction and involvement.

Similarly, building on the work of Lodahl and Kejner (1965), Cooper-Hakim and Viswesvaran (2005) defined job involvement ''as the degree to which an employee psychologically relates to his or her job and the work performed therein'' and specifically equated job involvement and job commitment. Similarly, in his review and meta-analysis of job involvement, Brown (1996) indicated that a ''state of involvement implies a positive and relatively complete state of engagement of core aspects of the self in the job'.

According to Scarlett Surveys, "Employee Engagement is a measurable degree of an employee's positive or negative emotional attachment to his job, colleagues and organization which profoundly influences his willingness to learn and perform at work." Schmidt et al (1993) defines employee engagement as a modernized version of job satisfaction, which is basically an employee's involvement with, commitment to and satisfaction with work. According to the Hay Group, engagement is comprised of two components: Commitment – affective attachment to and intention to remain with an organization and Discretionary Effort – the willingness to go above and beyond formal job requirements.

Organizational Commitment

Organizational commitment refers to the degree to which an individual identifies with an organization and is committed to its goals. Researchers like Wellins and Concelman, (2004) proposed that engagement is a combination of commitment, loyalty, productivity and ownership. They suggested that ''to be engaged is to be actively committed, as to a cause.''

The Corporate Executive Board (2004), a publicly traded company that provides advisory services to businesses worldwide, suggested that engagement is ''the extent to which employees commit to someone or something in their organization, how and how long they stay as a result of that commitment.' In these and similar definitions two possible threads of reasoning are implied; organizational and task/goal commitment. According to O'Reilly & Chatman (1986) commitment is regarded as a psychological state of attachment, while Meyer et al. (2004) regards commitment as a binding force between an individual and the organization.

Perceived Supervisory Support (PSS)

Supervisor who foster a supportive work environment by displaying concern for employees' needs and feelings, provide positive feedback and encourage them to voice their concerns, develop new skills and solve work-related problems (Deci & Ryan, 1987). Such supportive actions improve employee self-determination and their interest in work. Employees who are self-determined experience 'a sense of choice in initiating and regulating one's own actions' (Deci *et al.*, 1989, p. 580). These individuals are likely to feel safer to engage themselves more fully, try out novel ways of doing things, discuss mistakes and learn from these behaviors when they are in such supportive environments (Edmondson, 1996, 1999).

Their supervisor's orientation toward them is viewed by the employees as indicative of the organization's support hence Perceived Supervisory Support **(**PSS) is likely to be an important predictor of employee engagement (Rhoades and Eisenberger2002). In fact, a lack of support from supervisors has been found to be an especially important factor linked to burnout, an anti-thesis of employee engagement (Maslach et al. 2001). The findings by Bates (2004) and Frank et al. (2004) have shown that the support of first-line supervisors are believed to be especially important for building engagement and to be the root of employee disengagement (Bates 2004; Frank et al. 2004).

Job Satisfaction

Harter et al. (2002) explicitly referred to their measure (The Gallup Work Place Audit) as ''satisfaction-engagement'' (p. 269) and defined engagement as ''the individual's involvement and satisfaction with as well as enthusiasm for work'' (p. 269). The Gallup survey items tap evaluative constructs traditionally conceptualized as satisfaction factors, including resource availability, opportunities for development, and clarity of expectations.

Towers-Perrin (2003) suggested that "the emotional factors tie to people's personal satisfaction and the sense of inspiration and affirmation they get from their work and being part of their organization'' (p. 4).

The relevance of satisfaction is clear in that people invest more time in roles they find enjoyable (Rothbard & Edwards, 2003).Thus, Satisfaction when assessed as feelings of energy, enthusiasm, and similarly positive affective states becomes a factor of engagement (Macey and Schneider, 2008).

III. Research Methodology

Objectives of the Study

To determine the principal components of the independent variables of the Teachers Employee Engagement Model using SPSS.

1. To determine the principal components of the dependent variable of the Teachers Employee Engagement Model using SPSS.

Population of the Study

The population of research is the entire group of people that the researcher wishes to investigate (Sekaran 2003). The population for this study is the higher education teachers of the universities in India. In general, universities in India are recognized by the University Grants Commission (UGC), which draws its power from the *University Grants Commission Act, 1956*. There are three types of universities in India controlled by University Grant Commission (UGC), they are:

State University : State universities are run by the state government of each of the states and territories of India , and are usually established by a local legislative assembly act.

Deemed University : Deemed University, or "Deemed-to-be-University", is a status of autonomy granted by the Department of Higher Education on the advice of the UGC, under Section 3 of UGC Act, 1956.

Private University : Private universities are approved by the UGC. They can grant degrees but they are not allowed to have off-campus affiliated colleges.

Apart from the above universities, there are other universities and institutions that are established by Act of Parliament, under the purview of the Department of Higher Education in the Union Human Resource Development Ministry of India. These are:

Central University: Central University or a Union University in India is established by Act of Parliament and are under the purview of the Department of Higher Education in the Union Human Resource Development Ministry. Central universities are covered by the *Central Universities Act, 2009*, which regulates their purpose, powers governance etc.

Autonomous Institutes : There are other institutions that are granted the permission to autonomously award degrees. These institutes do not affiliate colleges and are not officially called "universities" but "autonomous organizations" or "autonomous institutes". They fall under the administrative control of the Department of Higher Education.

Sample of the Study

There are 661 universities and autonomous institutes in India. However, given limited accessibility to the population, as well as limited financial resources and time (Trochim & Donnelly, 2008), the sample for this study included university teachers of 58 universities / autonomous institutes including central universities, state universities, private universities and autonomous universities of India.

Number of Universities in the Sample of the Study

Type of University	Number of Universities
Central Universities	12
State Universities	22
Deemed Universities	13
Private Universities	6
Autonomous Institutes	5
Total	**58**

The sample which includes 689 university teachers was selected by a stratified random sampling through online media, Google Docs. The sample consisted of university teachers of various faculties (e.g., management, science, arts, commerce, medicines, architecture, engineering, pharmacy and others) at different job levels (i.e., the lecturer, assistant professor, associate professor and professor); from the government as well as non-government institutes or universities.

Development of Questionnaire

A structured questionnaire was used as a tool to collect primary data. A questionnaire is a list of carefully structured questions, chosen after considerable testing with a view to eliciting reliable responses from a chosen sample (Hussey & Hussey 1997). The questionnaire for this study included the following instruments and scales for measuring the variables under study.

Research Instruments and Tools

Variables to be Measured	Data Collection Method	Tools	Scale to be Used
Organizational Commitment	Qualitative/Quantitative	The six-item affective commitment scale used by Rhoades *et al.* (2001).	A five-point Likert-type scale with anchors (1) strongly disagree to (5) strongly agree.
Self – Efficacy	Qualitative/Quantitative	The ten-item self-efficacy scale adapted from Jerusalem & Schwarzer (1992).	A five-point anchors such as (1) strongly disagree to (5) strongly agree.
Job Satisfaction	Qualitative/Quantitative	The three-item scale adapted from Cammann *et al.* (1983). (α=0.84)	A five-point Likert-type scale with anchors (1) strongly disagree to (5) strongly agree.
Rewards and Recognition	Qualitative/Quantitative	The ten-item scale adapted from Saks (2006)	A five-point Likert-type scale with anchors (1) to a small extent to (5) a large extent
Perceived Supervisor Support –PSS (Leadership)	Qualitative/Quantitative	The four-item scale adapted from the SPOS (Rhoades *et al.*, 2001)	A five-point Likert-type scale with anchors (1) strongly disagree to (5) strongly agree.
Employee Engagement	Qualitative/Quantitative	the Gallup Q12 or GWA (2005)	A five-point Likert-type scale with anchors (1) strongly disagree to (5) strongly agree.

Data Analysis

Principal Components Analysis using SPSS

Principle Component Analysis (PCA) is a mathematical procedure widely used in exploratory data analysis. Principal Component Analysis (PCA) is a variable reduction technique, used when variables are highly correlated. PCA reduces the number of observed variables to a smaller number of principal components which account for most of the variance of the observed variables.

Latent constructs cannot be directly measured. They influence responses on measured variables and include unreliability due to measurement error. Observed (measured) variables could be linear combinations of the underlying factors (estimated underlying latent constructs and unique factors). Principal Components Analysis (PCA) describes the factor structure of your data.

An observed variable can be measured directly, is sometimes called a measured variable or an indicator or a manifest variable. A principal component is a linear combination of weighted observed variables. Principal components are uncorrelated and orthogonal. A latent construct can be measured indirectly by determining its influence to responses on measured variables. A latent construct could also be referred to as a factor, underlying construct, or unobserved variable. Unique factors refer to unreliability due to measurement error and variation in the data.

The number of components extracted is equal to the number of observed variables in the analysis. The first principal component identified accounts for most of the variance in the data. The second component identified accounts for the second largest amount of variance in the data and is uncorrelated with the first principal component and so on. Components accounting for maximal variance are retained while other components accounting for a trivial amount of variance are not retained.

Teachers Employee Engagement

Rotated Component Matrixa		
	Component	
	1	**2**
EE1	.192	.730
EE2	.222	.807
EE3	.289	.769
EE4	.676	.277
EE5	.703	.335
EE6	.750	.173
EE7	.611	.372
EE8	.578	.358
EE9	.544	.408
EE10	.663	.146
EE11	.787	.157
EE12	.719	.232

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Rotated Component Matrixa		
	Component	
	1	**2**
EE1		.730
EE2		.807
EE3		.769
EE4	.676	
EE5	.703	
EE6	.750	
EE7	.611	
EE8	.578	
EE9	.544	
EE10	.663	
EE11	.787	
EE12	.719	

Principal components analysis of Teachers Employee Engagement resulted in 2 Components (factors). **Component 1** can be called as **'Teachers Psychological Safety and Availability'** and **Component 2** can be called as **'Teachers Psychological Meaningfulness'**.
Items EE8 and EE9 have low factor loading (less than 0.60) and hence can be dropped for further analysis.

Self-Efficacy

Rotated Component Matrixa		
	Component	
	1	**2**
SE1	.706	.123
SE2	.663	.127
SE3	.698	.099
SE4	.603	.356
SE5	.684	.296
SE6	.613	.259
SE7	.058	.731
SE8	.339	.624
SE9	.152	.753
SE10	.306	.615

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Rotated Component Matrixa		
	Component	
	1	**2**
SE1	.706	
SE2	.663	
SE3	.698	
SE4	.603	
SE5	.684	
SE6	.613	
SE7		.731
SE8		.624
SE9		.753
SE10		.615

Principal component analysis of Self Efficacy resulted in 2 Components (factors). **Component 1** can be called as **'Teachers Abilities'** and **Component 2** can be called as **'Teachers Actions'**.

Rewards and Recognition

Rotated Component Matrixa			
		Component	
	1	**2**	**3**
RR1	.044	.760	.324
RR2	.410	.700	-.083
RR3	.194	.780	.226
RR4	.707	.372	.064
RR5	.795	.144	.085
RR6	.690	.122	.349
RR7	.622	.382	.239
RR8	.721	.040	.351
RR9	.268	.191	.797
RR10	.207	.183	.850

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Rotated Component Matrixa			
		Component	
	1	**2**	**3**
RR1		.760	
RR2		.700	
RR3		.780	
RR4	.707		
RR5	.795		
RR6	.690		
RR7	.622		
RR8	.721		
RR9			.797
RR10			.850

Principal component analysis of **Rewards and Recognition** resulted in 3 Components (factors). **Component 1** can be called as **'Intrinsic Rewards', Component 2** can be called as **'Extrinsic Rewards'** and **Component 3** can be called as **'Recognition'**.

Job Involvement

Rotated Component Matrixa		
	Component	
	1	**2**
JINV1	.254	.682
JINV2	-.034	.829
JINV3	.601	.241
JINV4	.532	.413
JINV5	.401	.439
JINV6	.446	.496
JINV7	.672	.079
JINV8	.735	.255
JINV9	.771	.055
JINV10	.701	.269

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Rotated Component Matrixa		
	Component	
	1	**2**
JINV1		.682
JINV2		.829
JINV3	.601	
JINV4	.532	
JINV5		.439
JINV6		.496
JINV7	.672	
JINV8	.735	
JINV9	.771	
JINV10	.701	

Principal component analysis of **Job Involvement** resulted in 2 Components (factors). **Component 1** can be called as **'Discretionary Effort'** and **Component 2** can be called as **'Absorption'**.
Items JINV4, JINV5 and JINV6 have low factor loading (less than 0.60) and hence can be dropped for further analysis.

Organizational Commitment

Component Matrixa	
	Component
	1
OC1	.706
OC2	.720
OC3	.647
OC4	.752
OC5	.758
OC6	.719

Extraction Method: Principal Component Analysis.

Perceived Supervisor Support (PSS)

Component Matrixa	
	Component
	1
PSS1	.898
PSS2	.909
PSS3	.922
PSS4	.251

Extraction Method: Principal Component Analysis.
Item PSS4 has low factor loading (less than 0.60), hence the item was dropped for further analysis.

Job Satisfaction

Component Matrixa	
	Component
	1
JS1	.918
JS2	.072
JS3	.921

Extraction Method: Principal Component Analysis.
Item JS2 has low factor loading (less than 0.60), hence the item was dropped for further analysis.

IV. Conclusion

Latent Constructs cannot be directly measured. PCA reduces the number of observed variables (or indicators) to a smaller number of principal components which account for most of the variance of the observed variables. Principal Components Analysis was conducted on the independent variables (latent constructs) and the dependent variable (latent construct) of the Teachers employee Engagement Model.

Principal component analysis of the latent construct Self-Efficacy resulted in 2 Components (factors). Component 1 can be called as 'Teachers Abilities' and Component 2 can be called as 'Teachers Actions'.

Similarly, the latent construct Rewards and Recognition resulted in 3 Components (factors). Component 1 can be called as 'Intrinsic Rewards', Component 2 can be called as 'Extrinsic Rewards' and Component 3 can be called as 'Recognition'.

Principal component analysis of the latent construct Job Involvement resulted in 2 Components (factors). Component 1 can be called as 'Discretionary Effort' and Component 2 can be called as 'Absorption'.

Principal component analysis of Teachers Employee Engagement resulted in 2 Components (factors). Component 1 can be called as 'Teachers Psychological Safety and Availability' and Component 2 can be called as 'Teachers Psychological Meaningfulness'.

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