

**TEACHER BELIEFS AND THEIR ATTITUDE TOWARDS ICT USE: A
COMPARATIVE STUDY BETWEEN KERALA AND ANDHRA PRADESH
PRE-SERVICE TEACHERS' BELIEF**

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Abstract

Information and Communications Technology (ICT) as a medium for teaching is becoming more and more acknowledged. This article shed light towards the epistemological beliefs and pedagogical beliefs of pre-service teachers of Kerala and Andhra Pradesh regarding their attitude towards ICT use in the classrooms. The survey demonstrates a major similarity between two states regarding their epistemological beliefs and slight differences in the perception related to pedagogical beliefs implementing ICT in educational field. Similarity in epistemological beliefs of two states rightly shows teachers' constructivist belief which absolutely emphasizes their interest in introducing innovative methods and approaches to make teaching and learning relatively 'constructivist-oriented', 'learner-centered', 'effective' and 'result oriented' process.

Keywords: Information and Communications Technology, Epistemological belief, pedagogical belief, constructivist-oriented, teaching and learning process

1. Introduction:

As an international phenomenon, technology exquisitely evolved into the daily lives of whole humanity in the form of various purposes that turned out the life more comfortable and practicable. It indeed emphatically affected the teaching and learning process especially leading to a strong effective input as well as output. With the importance of technology in education, technology integration has been greatly emphasized in teacher training and professional development (Lawless & Pellegrino, 2007). However, it has been criticized that teachers have not been provided with adequate support that goes beyond learning specific technology skills (e.g., using a particular tool or software program) (Llorens, Salanova, & Grau, 2002).

In recent years, technological pedagogical content knowledge (TPACK; changed from TPCK in Thompson & Mishra, 2007) has been studied to understand what knowledge and skills teachers lack and what professional development ought to target in order to systemically improve

effective use of technology in teaching (Koehler & Mishra, 2009; Mishra & Koehler, 2006). Many researchers argue that teachers' integrative knowledge of technology, pedagogy, and content that goes beyond specific technology skills should be emphasized in teacher development programmes. Using information and communication technologies (ICT) to support constructivist-oriented pedagogies are generally reported to be an important strategy in learning and teaching process. Many educational technologists like Jonassen, Howland, Marra and Crismond (2008) have pointed out that ICT has substantial potentials in facilitating the shift from traditional pedagogical practices to constructivist-oriented learner-centered teaching practices. They explain how ICT can support active and collaborative learning among students by providing students with access to information resources through the Internet and the knowledge construction medium such as hypermedia authoring tools and concept mapping tools. Therefore, learners can form intellectual partnerships with

ICT and exploit the affordances of computers to perform higher order cognitive tasks such as hypothesizing and meaning making and negotiation models.

While the general provisions of ICT resources are improving in most countries, changes in teaching practices are less forthcoming. Recent research indicates that teachers' use of ICT is largely minimized to a few productivity tasks such as preparing lessons with word processors and power point presentations meanwhile entirely unaware of multifaceted use of the technology. From the literature, many factors have been found to inhibit teachers from utilizing ICT in engaging students in meaningful learning. These include the lack of ICT leadership, traditional assessment practices, teachers' characteristics such as self-efficacy and low perceived control over the computers and environmental conditions such as the lack of facilitating conditions. A survey conducted by Hu, A. Wong, Cheah, P. Wong, & D'Rozario (2004) of more than 3000 beginning Singaporean teachers revealed that while teachers were already using ICT for routine work, they did not engage learners to co-construct knowledge constructively with ICT. Ertmer (2005) reported a similar phenomenon in America and attributed this to teachers' epistemological and pedagogical beliefs as a deeply rooted barrier.

In an attempt to understand why technology is differently (or not at all) integrated into teaching among teachers who are equipped with relevant knowledge, two sets of barriers are often discussed (a) first-order barriers concern factors such as environmental readiness (e.g., computers, the Internet access) and teacher knowledge (e.g., TPACK); (b) second-order barriers include factors such as teachers' beliefs (Ertmer, 1999, 2005; Hew & Brush, 2007). Second-order barriers, defined as the intrinsic factors that hinder technology integration, can interfere with teachers' technology integration even when first order barriers are overcome. It has been well documented that technology availability creates the possibility of effective technology integration but knowledge pertinent to pedagogy and content are required to realize the full potential of teaching technologies to improve learning and instruction. Nonetheless, the acquisition of technology and knowledge does not always lead to effective technology integration (Polly, Mims, Shepherd, & Inan, 2010). Teachers' persistent beliefs about current practices are recognized as second-order barriers that delay or inhibit technology integration. Even though, many computer programs can be utilized as knowledge construction platforms, teachers' beliefs towards the integration of technology in classrooms play a vital role in achieving fruitful result in the educational sector. Becker's (2000) study indicates that teachers

who encourage student to use computers to investigate and research about phenomenon are also more oriented towards constructivist beliefs.

1.2 Aim and objectives of the study

The aim of this study is to examine pre-service teachers' epistemological beliefs and pedagogical beliefs, and how these beliefs are related to their attitude towards ICT use. Moreover, it tries to establish a baseline description of the pre-service teachers' beliefs about the implementation of modern technology in the classroom context. This study has the potential to provide information regarding teacher professional development in Kerala and Andhra Pradesh, two southern states of India that generally conceived to be the same socio-cultural background (Nisbett, 2003) but slight differences in terms of technical developments in each state. Andhra Pradesh, a well known state of India for the advancement and adaptability of technology in various spheres of their life, comparatively demands more recognition than Kerala state on account of the rich culture they possess towards technology implementation in classrooms. Albeit, looking at literacy rate of Kerala and Andhra Pradesh it clearly demonstrates a high rate of 93.34 and medium rate of 64.3 between these two states respectively. This contrast fact unsurprisingly led the researcher to study about the teachers' belief regarding ICT use in classroom hypothesizing Andhrates are more sophisticated in their epistemological and pedagogical beliefs in relation to their attitude towards the ICT use thanks to their rich knowledge and approach in technical field than Keralites who are generally on the initial stage of adapting technology in this educational field.

2. Literature review

As I mentioned above, the study typically examines teachers' epistemological beliefs and pedagogical beliefs in relation to their attitude towards the ICT use. We define epistemological beliefs to be one's perception about knowledge and about knowing. Other constructs such as belief about learning effort and innate ability, which are usually reported as part of epistemological studies, are not treated as core epistemological beliefs (Hofer & Pintrich, 1997). They are not included in this study. We define pedagogical beliefs as one's views about teaching, which are generally classified as constructivist oriented or transmissive oriented (Chan & Elliot, 2004; Teo & Chai, 2008) These constructs are reviewed sequentially in the following paragraphs with an emphasis on studies involving pre-service teachers.

Research on beliefs about knowledge and about knowing or personal epistemology by educational researchers began in the late 60s. Perry (1970) was among the first researchers who established a pattern of epistemological development among college students. Generally, college students progressed from a naive epistemological belief that views knowledge as certain and is passed down from authority, to a more sophisticated and relativistic stance that emphasized knowledge as uncertain and constructed by individuals based on warrants. This general pattern of development was also observed by later researchers who also relied on interview as the method for data collection (Hofer & Pintrich, 1997). Building on these earlier works, Sutton, Cafarelli, Lund, Schurdell, & Bichsel (1996) reported the epistemological development of 32 student teachers near the end of their teacher education. More than half of them were assessed to be at the higher end of epistemological development. White (2000) and Brownlee's (2001) studies on student teachers further strengthened Sutton et al.'s (1996) findings. In summary, these studies indicate that student teachers' epistemological beliefs are distributed across the developmental

stages with more of them holding relativistic beliefs. These studies also found very few pre service teachers had held absolutists/ dualistic epistemological beliefs.

Schommer (1990) proposed a model of five more or less independent dimensions of epistemological beliefs. The dimensions include the structure, certainty, source of knowledge, and the control and speed of knowledge acquisition, with the last two dimensions pertaining to learning. Hofer & Pintrich (1997) contested that the last two beliefs should not be included in the study of epistemological beliefs as philosophically, the latter are not core matters of epistemology. However, it is not uncommon to see control and speed of knowledge acquisition being included in the literature as beliefs about learning. To measure the five dimensions of beliefs, Schommer (1990) developed the Epistemological Beliefs Questionnaire (EBQ) which has enabled many researchers to study the relationships among epistemological beliefs and their related constructs.

On the issue of students' learning, myriad studies have documented that epistemological beliefs are associated with learning strategies, academic achievements, interpretation of text and conceptual change (for example, see Braten & Stromoso, 2005; Chan, 2007; Mason & Boscolo, 2004). In general, sophisticated epistemological beliefs are positively associated with learning and higher order thinking. However, studies that explored the relationships between teachers' epistemological beliefs, pedagogical beliefs and teaching practice are generally lacking (Chan & Elliot, 2004), especially in the Asian context (Chan, 2007.).

Obviously, this area warrants further research since epistemological beliefs are closely linked to teaching and learning. The relationship between teachers' epistemological beliefs and their beliefs about teaching and learning is complex. First, beliefs about what teaching and learning can be broadly classified under the knowledge transmission category or the knowledge construction category (Entwistle, Skinner, Entwistle, & Orr, 2000; Samuelowicz & Bain, 2001). The former is characterized as teacher-centered, content-oriented didactic teaching practice that emphasizes passive reception of knowledge by students. As for the latter, it is usually characterized as student-centered, learning-oriented constructivist teaching that encourages students to actively make sense of their experiences situated within the social cultural contexts. Second, teachers with more sophisticated epistemological beliefs seem to be more engaged than their peers with regards to personal learning. For example, Ravindran, Greene and DeBacker (2005) reported that pre-service teachers' epistemological beliefs and their goals of learning were related to their level of cognitive engagement during teacher preparation. Third, the relationship between pre-service teachers' epistemological beliefs and their pedagogical beliefs seems to be incongruent at times. A review of studies focusing on pre-service teachers' beliefs indicates that they are likely to perceive teaching as an unproblematic process of knowledge transmission (Richardson, 2003). The predominance of teacher-centered didactic views of teaching among pre-service teachers seems to contradict the above-mentioned studies that suggest pre-service teachers tend to hold relativistic epistemological outlooks. For example, Chan and Elliot (2004) surveyed 385 Hong Kong pre-service teachers and reported that most of the teachers were relativistic in their epistemological outlooks. However, they were not inclined towards constructivist teaching. Chan and Elliot's 2004 research indicate that beliefs towards authority as source of knowledge and the view of knowledge as certain are both significantly and positively correlated to traditional teaching. The belief towards authority is also significantly correlated to the conception of constructivist learning. This seems to point to a possibility that the pre-service

teachers may hold inconsistent views about epistemological beliefs and their pedagogical beliefs. Sinatra and Kardash's (2004) study of American student teachers, however, indicates that teachers who see knowledge as evolving and learning as a process of constructing understanding are also more receptive towards the idea of teaching as facilitating knowledge and beliefs revision among students. Given that studies in different contexts may indicate different relationships between epistemological beliefs and beliefs about teaching and learning, it seems clear that more cross-cultural studies are required (Hofer, 2008).

Research that studied the relationships between teachers' epistemological beliefs and their perception of ICT use generally suggests that teachers who hold constructivist beliefs are more likely to engage their students to use computers and the Internet (Becker & Ravitz, 1999). However, epistemological belief is just one factor among many others that influence teachers' attitude towards ICT use. Wozney, Venkatesh, and Abrami (2006) employed the expectancy-value theory to study relationship between teachers' use of ICT and their perceived value of ICT. The results indicate a positive relationship between the two constructs. Zhao, Pugh, Sheldon, and Byers (2002) investigated the complexities involved in integrating ICT into classrooms. Their analyses indicate that a successful integration of ICT depends on the interrelationships among the school contexts, the key drivers (teachers) of the integration project, and the information technology involved. Specifically, when the technology chosen for implementation is compatible with the teachers' pedagogical beliefs, there is a higher chance for integration to occur. Fox and Henri's (2005) investigation of Hong Kong teachers' perspective on the use of ICT reveals that a perception towards the goal of education as producing good examination results will inhibit teachers' use of ICT. In addition, Teo, Chai, Hung, and Lee (2008) found that teachers' beliefs in teaching and learning played a significant role in teachers' ICT usage, whether it was used in a traditional or constructivist way.

The above literature review has mapped out the complex relationships among teachers' epistemological beliefs, pedagogical beliefs, and their perception of ICT use. The study attempts to investigate the beliefs of pre-service teachers from two states that one stands as epitome for technical developments and the other for highest literacy rate in the whole country.

3. Research questions

1. What is the profile of the pre-service teachers from Kerala and Andhra Pradesh in terms of their epistemological beliefs and pedagogical beliefs?
2. Are there significant differences between Keralite and Andhra Pradesh's pre-service teachers in terms of their epistemological and pedagogical beliefs?
3. To what extent are pre-service teachers' epistemological and pedagogical beliefs related to their attitude towards ICT use?

As discussed above, more comparative studies are required in order to better understand the different relationships between epistemological beliefs and beliefs about teaching and learning across different cultural contexts (Hofer, 2008). The present study represents such research initiative, and I selected Kerala and Andhra Pradesh due to their similar reform emphasis on constructivist education and their cultural and contextual difference in the formation of developing curriculum and materials.

4. Methods:

4.1 Participants and data collection

The participants for this study were pre-service teachers who volunteered themselves as to be part of the research work. They were selected from the post graduate certificate in the teaching of English (PGCTE) classes conducted by EFL University, Hyderabad. The participants were completed their bachelor degree in education and were in their initial stage of teaching in schools. The participants completed a questionnaire containing items that were adapted from various sources (Table 2). The Each participant spent approximately 15 minutes to complete the questionnaire. No course credits or any form of reward was offered to participants in this study.

Table 1 shows the profile of the participants in this study.

State	age	Qualification		Gender	
		Under graduate	Postgraduate	Male	Female
Kerala (N=10)	30 or less	NIL	10	6	4
Andhra Pradesh (N=10)	30 or less	NIL	10	5	5
Overall N=20		0	20	11	9

4.2 Measures

The questionnaire contained three parts. The first part of the questionnaire solicits demographic data such as age, gender, and qualification. The second part of the questionnaire was an abridged version of the instrument that was used in Chan and Elliott (2004). This modified version covers four dimensions: (1) Certainty of Knowledge (CK) and (2) the Authority/Expert knowledge (AEK) as the two dimensions of epistemological beliefs (and sophisticated epistemological beliefs means less inclined to believe in both dimensions); (3) Traditional Teaching (TT) and (4) Constructivist Teaching (CT) as the two dimensions of pedagogical beliefs. The third part of the survey measured the teachers' attitude towards computer use (ATCU). These items were adopted from a recent survey by Teo, Lee and Chai (2008). All items employed a 5-point Likert scale (5 =strongly agree, 1 = strongly disagree). A high score indicated a favorable response towards the measured construct. Table 2 shows the beliefs and constructs that were measured in this study.

4.3 Results

Regarding two dimensions, Certainty of knowledge (CK) and the Authority/ Expert Knowledge (AEK), as the two dimensions of epistemological beliefs the study found a broad correlation with both states. Responding to the questionnaires indicating CK the participants from both states shared the same perceptions and marked 76% of the questionnaire with similar views except 24% which it shares with the quota of “no opinion”. The second construct, AEK also follows the

suit while showing mere difference regarding their beliefs in questioning the expert authority stands a discord between both states where Keralites have more tendencies to look over the theories mended by experts rather than following the experts with blind eye.

Secondly, related to the pedagogical beliefs, it was found that participants' constructivist and traditional teaching beliefs are slightly vary between the states. Both Keralites and Andhraites are more enthusiastic in exploring new teaching methods and styles and takes more initiatives for student-centered classrooms where students are become active learner and teacher plays as a role of facilitator. But 30% Andhraites favoured traditional way of teaching giving importance for learning through drill and practice.

Thirdly, the correlation in attitude towards computer use (ATCU) was very high between both states. Both states claimed 90% in believing the use of computer technology in the classroom makes teachers feel more competent as educators, and strongly disagreeing in the perception of students' use of computer results in neglecting important traditional learning resources like library books. Surprisingly, all the participants use computer and digital equipments almost monthly keeping themselves updated in this spectrum.

The overall result shows that there is broad correlation in CK and EAK between two states which clearly demonstrates similarity of epistemological belief in both states, but, a slightly difference in pedagogical beliefs of teachers between both states. Nevertheless, ATCU results highlight the relevance of computer knowledge in the beliefs of both state teachers and shows very similar reaction towards in their attitude to computer and technology use. Therefore, the study found that the relationships between teachers' epistemological beliefs and pedagogical beliefs of both states have a fine correlation in promoting constructive teaching rather than traditional teaching and found high correlation with positive view in the attitude towards computer use.

5. Discussions and summary of findings

The results of this study indicate that both Keralites and Andhraites pre-service teachers do not believe strongly in authorities and experts as sources of knowledge. They are also not inclined towards seeing knowledge as certain and unchanging. In other words, the epistemological beliefs that these teachers hold are generally consistent with what is reported in literature that we have reviewed earlier. For example, surveys of Hong Kong and Singapore pre-service teachers' epistemological beliefs using similar items from Chan and Elliot (2004) had documented comparable epistemological profile (see also Chai & Khine, 2008). In this study, 20 of the surveyed teachers had obtained their post graduation certificate in English literature and have bachelor degree in education. These teachers have the basic epistemological outlooks that are consistent with constructivist teaching. As far as the profile of teachers concerned it supports the notion of reformations geared up towards constructivist teaching attitudes irrespective of cultural or state boundaries. There is no statistical difference in the dimensions measured. Both Kerala and Andhra Pradesh pre-service teachers are strongly inclined towards constructivist teaching and less inclined towards traditional teaching. This should be a logical stance given their relativistic epistemological profile. However, this may not always be the case as Chan and Elliot's (2004) study had testified. The authors surveyed 385 Hong Kong pre-service teachers and reported that most of the teachers were relativistic in their epistemological outlooks, but they were not inclined towards constructivist teaching. Based on the reported mean score, it seemed that the Hong Kong pre-service teachers are neither inclined towards constructivist (M=1.86) nor

traditional teaching ($M=2.63$). It seems that the Keralite and Andhraite pre-service teachers are holding more compatible epistemological and pedagogical belief.

Statistical differences were detected between the Keralite and Andhraite teachers' pedagogical beliefs. While the Kerala teachers had expressed a stronger inclination (100%) towards constructivist teaching, Andhra Pradesh teachers expressed an average inclination (65%) and also shown 30% inclination towards traditional teaching. Usually, constructivist teaching and transmissive teaching are treated as forming the two opposing ends of a continuum as reported by western literature (Entwistle et al., 2000; Samuelowicz & Bain, 2001). However, Andhra Pradesh, generally, has manifold opportunities and exposure regarding universities, educational institutions, and technical advantages than Kerala but reluctance to come forth for implementing innovative methods and teaching belief and approaches keep the state far behind to achieve the centum in literacy rate like Kerala. Politicization in educational sector especially in curricula and syllabus plays an inevitable role in deferring teachers' innovative approaches to teaching and learning process. Meanwhile, educational background of rural area in Andhra Pradesh shows deteriorated condition that can hardly be seen in the Kerala's educational stream. This sort of causes might be resulted in neglecting strong approval for constructive teaching in AP. In terms of their attitude towards computer use, both Keralites and Andhraites pre-service teachers expressed moderately positive attitudes.

As expressed in our research question, a major interest in the present study is to look at ways in which pre-service teachers' epistemological and pedagogical beliefs are related to their attitude towards ICT use. As baseline information, the two major dimensions "expert knowledge" and "certainty of knowledge" in epistemological beliefs are found to be correlated, suggesting that the de-emphasis on expert knowledge (for the most part) goes hand-in hand with relativism. Further results showed that there is a significant negative correlation between ATCU and Authority/Expert Knowledge (AEK) for the Keralite sample. In contrast, it was found that there was a correlation between ATCU and Traditional Teaching (TT) for the Andhraite sample. This seems to suggest that extensive effort should be recommended to make aware Andhra teachers to use innovative methods and approaches that help them to come up with ICT model strategies. Although, the cultural context in both states is generally considered as similar, there still exists some subtle cultural difference in beliefs that influences how teachers use ICT to support teaching. On the other hand, in terms of relationships between ATCU and Constructive Teaching (CT), no significant correlation was found for both the Keralite and Andhraite samples. It is possible that despite showing support for constructivist teaching, the pre-service teachers from both countries were not yet ready to adopt ICT into actual constructivist teaching practice. Arguably, there may be a misalignment between the teachers' teaching beliefs and actual practices, indicative of the tension between what should be done and what is being done. This may have something to do with cultural or contextual factors.

As mentioned in the literature review, how epistemological beliefs and pedagogical beliefs are related to the teachers' attitude towards computer use is not a well researched area; therefore, these results need to be verified with further studies. In future studies, items measuring the teachers' attitude towards computer should be replaced with items measuring teacher's attitude on the use of computer in education, in general, and in constructivist education, in particular. My plan is to address these issues in my further studies. I also suggest that future

research should employ multiple regressions to investigate the relationships of the constructs with larger sample size.

6. Conclusion

The extent of technology integration in classroom, undoubtedly, is influenced by, among other factors, teachers' epistemological and pedagogical beliefs and their attitude toward computers. The survey indicates the beliefs of pre-service teachers both from Kerala and Andhra Pradesh were exclusively contemplating about the reformation in teaching and learning process towards the form of constructivist teaching. The results demonstrate the teachers' epistemological beliefs have same value in both states but projected a slight difference in the form of pedagogical beliefs and their attitudes towards computer use between the respected southern states of India. Further studies are recommended as the objectives to investigate relationships between practicing teachers' beliefs and their teaching practices, and their use of ICT in schools that would be seen another set of up and downs in the implementation of ICT in classrooms.

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