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Abstract

Purpose: The purpose of this study was to explore the ICT and reflective practice integration in teacher preparation at Primary Teachers Colleges and to establish whether these practices were among the constructivist approaches being used to teach students.

Methodology: This phenomenological study explored the lived experiences of tutors and students in light of constructivists' teaching. It involved 3 PTCs and 15 participants who were purposively sampled. This study used a qualitative research design. Data was gathered using in-depth multiple interviews and analyzed following Moustakas (1994) procedure.

Findings: Data analysis and results revealed that tutor's continue to rely on traditional approaches in both instruction and supervision of school practice. The colleges are in a nascent stage in the integration of ICT and reflective practice in education being accustomed to traditional instructional practices and lack of motivation and knowledge among tutors to adopt ICT in teaching.

Unique Contribution to Theory, Practice and Policy: This research study adds to the body of knowledge suggesting ways in which constructivists' teaching supports teaching effectiveness and promotes students' learning amplifying the need for ICT and reflective practice integration in instruction. The study recommends establishing and setting up Reflective Practice Laboratories in Primary Teachers Colleges for tutors and students induction on several constructivists' practices that include systematic reflection, clinical supervision, use and integration of ICT and other interventions in a proper and professional setting.

Keywords: *Authenticity, constructivists', engagement, teacher- preparation, reflective practice.*

Introduction

Education is a key to the global integrated framework of sustainable development goals (UNESCO, 2015) which raises the demand for a stronger focus on teachers and educators as change agents across the board. Teacher education is so far the most important and known way of preparing change agents because success in educational reforms depends on the teachers' awareness of the new changes, their attitudes to it and how they situate the reforms in the daily operations (Snoek, Swenen & Klink, 2010).

The 21st Century demands effective teacher - preparation where theory and practice are linked effectively and a totally new progressive and innovative approach to teaching and learning as a way to break away from the traditional and conservative approaches (Pitsoe & Maila, 2012). The role of teacher educators today is to mend the existing system with vision to help teacher education grow as a profession and produce quality teachers for schools (Banerjee, 2013). Practice must be at the core of teachers' preparation and entails close as well as detailed attention.

Learning to learn has never been as important as it is today. The knowledge required is identified through schools, teachers and communities. It is knowledge that is explored, researched, experimented with, and created according to human need and only possible through constructivist approaches. It is knowledge used for developing basic language and communication skills, for solving problems, and knowledge that is arrived at in ways that nurture the ability to access and critically process information (UNESCO, 2015) which can be realized by application of technology in instruction and learning.

Behaviorism and constructivism are predominant educational theories that form the basis of many today's educational theory and technology. According to Mensah (2015), different philosophical perspectives have drawn increased attention to contrasted beliefs about the nature of knowledge and truth. These disagreements emanate from researchers' epistemological and ontological positions regarding what knowledge is and how it can be acquired. The objectivist and the constructivist traditions mark the opposite ends of that continuum (Cronje, 2006). Unlike the behaviorists who treat a learner as a tabula rasa, the constructivists see learners as being active rather than passive believing that knowledge is not received from the outside or from someone else; rather, it is the individual learner's interpretation and processing of what is received through the senses that creates knowledge. A major emphasis of constructivists is situated learning, which sees learning as contextual with learning activities that allow learners to contextualize the information. Learning is moving away from one-way instruction to construction and discovery of knowledge.

Studies indicate that active participation is more effective in a learning environment that emulates an authentic and real world learning environment (Gupta, 2011).The characteristics of an effective teacher are grounded in the constructivism theory where the

teachers are facilitators who practice constructivist teaching and create a learning environment with technology which encourages learners to actively process and organize information by making internal cognitive connections. Constructivists informed teaching portrays the shift in the role of teachers from the traditional teaching environment to settings that encourage active students' participation in the learning process (constructivists learning environment).

Constructivist-informed teaching is a way of teaching that is characterized by learner centeredness, engagement, inquiry and knowledge construction (Palmer, 2005) within an appropriate conducive learning environment. It embraces the use of e-learning and integration of ICT in instruction. The constructivists' teaching approach has gained tremendous attention with e-learning taking up the baton of education and training from the traditional method. Educationists and instructional technologists are working overtime to define various aspects of the theory and its application letting the learner to create his/her own learning. The computers and internet provide immense possibilities for the learners to explore learning on their own. There is a growing demand for Information and Communication Technology (ICT) to be included in school education. Colleges too; ought to orient, sensitize and equip the students with the skills to use ICT for their own professional development.

The constructivist approach reflects a theoretical shift in perspectives of learning and instruction that emphasises the social and contextual nature of learning (Kim, 2005). According to Agrawal (2017), the earlier proponents of constructivism include; Budda (560-477 BC), Heraclitus (540-475 BC) the philosopher of endless change. In western cultures; Giambattisa Vico (1668-1744), Immanuel Kant (1724-1804) and Arther Schopenhauer (1788-1860). The Constructivist informed teaching is traced back to the methods used in ancient Greece and China. It was used by Socrates (470 BC-399 BC), who used questions to draw out what was already within the student to enable them reason and to recognize their own weaknesses in thinking (Tracey & Morrow, 2012). Socrates had a firm belief that ideas exist prior to experience (Jordan, Carlile & Stack, 2008). The constructivists have a different perspective on the source of knowledge, truth and reality. Just like sophists, they believe in self-knowledge construction, possibilities of multiple interpretations and realities. Jesus too was a constructivists' teacher whose teaching had traits of an authentic experience and use of prior knowledge. Jesus philosophy treats education as the process of preparing people for life.

Olusegun (2015) states that the contemporary constructivist conceptions of learning and instruction have their historical roots in the work of Dewey, Bruner, Vygotsky, and Piaget. According to Chabra *et al* (2013), Bruner and Piaget are considered the chief theorists among the cognitive constructivists, while Vygotsky is the major theorist among the social constructivists. By the research conducted in the 1980s, the works of Dewey and Vygotsky

blended with that of Piaget in developmental psychology hatching into a broad approach of constructivism stressing the basic tenet that students learn by doing rather than observing. This further blended with Bruners constructivist domain that students bring prior knowledge into a learning situation in which they must critique and re-evaluate what they comprehend of it.

Bruners theory of education in the 1960s and the 1970s directly influenced the programs of education formulated during those decades. Bruner was a central player in the cognitive revolution and a radical constructivist. This movement looked beyond behaviorist models of mind to explore the mind in use. Bruner noted that the emphasis began shifting from 'meaning' to 'information,' from the construction of meaning to the processing of information. Bruner developed the constructivists' theory on the Socratic tradition of learning through dialogue, encouraging the learners to enlighten themselves through reflection. Bruner believed that learning involves three processes namely: knowledge acquisition, knowledge transformation and knowledge review (Jordan, Carlile & Stack, (2008).

Though the constructivist theory seems to be focused on learning, it is the constructivist informed teacher who enables the constructivists learning environment. There is a reciprocal relationship between learning and teaching to the extent that it is very difficult to treat each process in isolation (Kellough & Carjuzaa, 2009). Aware that very many scholars are alienated to learning, it was imperative to use the constructivists learning theory from the teaching perspective which for long has not attracted many scholars.

Teachers must become constructivist by providing a learning environment where students search for meaning, appreciate uncertainty, and inquire responsibly. This therefore requires the teachers' philosophical orientation to shift from the role of purveyors of knowledge to facilitators and coaches who enable students' knowledge construction.

According to Chabra et al (2013) state that besides constructivism being a theory of learning, it has progressively expanded its dominion to becoming a theory of teaching, a theory of education, a theory of the origin of ideas, and a theory of both personal knowledge and scientific knowledge. Proponents of Constructivism attempt to show connections between constructivist teaching/learning strategies and educational technology in instruction.

Teachers' preparations need to encourage the teaching of skills in using array of constructivists teaching strategies and methods like; the cooperative learning, active learning, discovery, inquiry and project methods along with modern technologies as this will increase effectiveness in working with students from diverse backgrounds. The twenty first century teachers need to be familiar with the new technology and incorporate it in classroom teaching. This use of technology in learning helps the students interacts with the

contents, programmed interface, the instructor, and other learners both individually and in groups.

The use of technology in teaching in classroom requires the prospective teachers to have used the facilities and are familiar with the use of ICT in their classes. Indeed the teachers need to have skills on the operating particular technologies, which includes knowledge of operating systems and computers hardware and also use standards sets of software tools such as word processors, spreadsheets, browsers and e-mails. Technology can and should be used to support new social arrangements in teacher education. It may be useful for teacher preparation institutions to think of one of their responsibilities as the need to produce technically literate teaching professionals.

Statement of the Problem

Educational practice is continually subjected to renewal needs due to the growing proportion of information communication technology, social changes, globalisation of education, and the pursuit of quality(Dorit,2016) .These types of renewal needs require developing updated instructional practices that could integrate knowledge with the personal transferable skills (Pellegrino & Hilton, 2012).

When constructivists informed teaching is used in PTCs, the students are likely to emulate and be able to use the same when teaching in primary schools. However, despite the growing attention paid to constructivist pedagogic challenges in the context of learning environments, the instructional principles of this theory, which are aimed at directing the nature of educational processes, still need to be actualised (Dorit, 2016).

Teacher education is confronted by a prevalent gap between theory and practice as students cannot readily translate what they are told into practice. This prevalent gap does not enable students to have the confidence and creativity to handle day to day problems with a theory-guided action. Though the tutors are aware of the constructivists and other modern approaches for the 21st century, implementation is strained due to the fixed mindset and conservative tendencies of the tutors manifested in failure neither to demonstrate nor guide students. According to Maani (2013), many teachers use teaching methods that promote regurgitation of content due to the emphasis put on passing national examinations. This implies that poor pedagogical methods in PTCs lead to poor pedagogical methods in primary schools a situation that should be corrected.

The fixed mind set has perpetuated the traditional transmission model while hindering the pace of reforms in the sector and consequently leading to low teacher competence and quality of education (Darling-Hammond, 2006; Lin, 2013; Wang, 2016; Mbugua, 2011; Kablan &Kaya, 2014).

The emergence of ICTs as learning technologies has coincided with a growing awareness and recognition of alternative theories for learning of which the greatest sway today are those based on constructivist principles. These principles posit that learning is achieved by the active construction of knowledge supported by various perspectives within meaningful contexts. ICT is instrumental in shifting emphasis for learning environments from teacher centered to learner centered. Where teachers move from being the key source information and transmitter of knowledge to students so, the role of students changes from passivity to activity. ICT changes the concept of learning within the four walls as the introduction of technology breaking the boundaries of colleges and offers the students an opportunity to learn irrespective of place and time. The individuals can accesses the data whenever they want and from where ever there is learning. However, lack of awareness towards technology and utilization technology with improper knowledge add complexities for the successful implementation of ICT in colleges.

Methodology

The research Methods for the constructivist philosophical paradigm includes Narrative Study, Case Study, Ethnographic Study, Grounded Theory, Descriptive Study, and Phenomenological Study (Kim, 2005). A unique commonality of all these methods is the great deal of time spent in the comprehension of the phenomenon being studied within natural contexts. Phenomenology was appropriate for this particular study because it enables scholars to have a humanistic outlook towards man and the world. Phenomenology is based on constructivist philosophy on the premise that the phenomenon is constructed by a cognitive subject who is a human being. The constructivist view is that the subject constructs what it knows while the phenomenological view is that the subject knows what it construct. The researcher utilized the qualitative research design for undertaking this review. Interviews and observation analysis were largely used for reviewing literature on the subject while highlighting the relevance of the qualitative research approach.

Data Collection and Instruments

The study was conducted in 3 purposely selected Primary Teachers Colleges namely; Jinja PTC, Kaliro PTC and Bishop Willis Core PTC which are located in the South Eastern Uganda and involved 15 respondents. According to Padilla- Diaz (2015), the sampled group should consist of 3 to 15 members who must be able to articulate their lived experiences and the guiding principle should be the concept of saturation (Mason, 2010). The selected colleges comprised government core and non - core PTCs that manifested well the phenomena under study mainly the focus on the instructional process and pedagogical preparation. The target population consisted of three School Practice Coordinators, six tutors and six year two PTC students as the main respondents.

Yuksel and Yildirim (2015) explain that the researcher can decide whether participants share significant and meaningful experience concerning the phenomenon under the investigation.

The instruments commonly used in the constructivism philosophical paradigm are; through interview, observation, document review and visual data analysis (Kalender, 2007). For this study, in depth unstructured interviews were used aware of the greater flexibility and freedom these offer to both the interviewer and interviewee.

Data analysis

Phenomenological research does not prescribe specific techniques in data analysis since imposing a method on analyzing a phenomenon stifles its integrity (Groenewald, 2004). For this study, data was analyzed following all data collection and transcription, using the framework as described by Padilla-Diaz (2015) and Moustakas (1994).

ICT integration

The integration of ICT is a constructivists' practice that enhances students' engagement, research, critical thinking and creativity. The integration of ICT in instruction is evolving and gradually unfolding as both tutors and students see its relevance. The study probed the use and integration of ICT in instruction. The integration of ICT is a constructivists' practice that enhances students' engagement, research, critical thinking and creativity, unfortunately the level of integration is very low limited to surfing on the internet and use of phones.

The colleges have internet which is intended to enable tutors and students to access information. Students use the computer laboratories as well as their phones. Unfortunately, students spend more time on e-mails, whatsapp and Facebook which they find free when they use the college internet. The tutors too lack digital literacy and fluency which fails to adapt them well to current pace and the 21st century world stance. The colleges have a challenge of students of spending more time chatting with friends on facebook and whatsapp than utilizing internet on productive things. SC2 mentions that;

> *I have never used technology here at college. By the way we can use the phone to research things that we cannot find in textbooks. We can use that smart phones.*

On integration of ICT in instruction, tutors expressed that mildly it's evolving as both tutors and students see its relevance. TB2 reveals that in case of uncertainties and misconceptions, with the internet all required information can be availed. TB2 states that; *A clique on Google will give robust information.*

TA1 and TC1 reported that the internet in colleges and permitting students to have phones in colleges has enhanced there research and sharing of information. They asserted that;

> *Especially now with the digital age, we realize they are also now making research, using the system. Students apply some technology like they have started using phones.*

SC2 concurs and affirms that;

> *We can use the phone to research things that we cannot find in textbooks. We can use that smart phones.*

The tutors neither use ICT in their teaching nor supervision. This implies that students too have difficulty in integrating ICT in their teaching. The participants need to be exposed to the proper use and benefits of ICT in education.

Reflective practice

The practice in colleges that relate to reflection is self-evaluation and unfortunately students do not give more thought as many simply write "successfully taught" as a routine remark or comment.

Reflective practice is not familiar to students even to the tutors and yet it gives the privilege to act and think about their actions. Reflection as an activity is not a common practice in colleges since neither the tutors nor the students had any form of structure to follow when reflecting on sessions. The experience of this practice was limited to the component of self-evaluation on lesson plans while not aware that reflective practice is structured formal and a routine activity in modern teaching. The use of reflective journals as well as post observation records is not in practice.

Records like reflective journal and journal wheel have never been used and therefore not known. The reflective practice requires a formalized self-observation and self-evaluation articulating areas of weakness during a presentation as well as options or remedies for improvement in the next sessions. Reflective practice is significant and it has a high potential of bringing about desirable improvements and changes in the teachers instructions.

The researcher wished to scrutinize any document to serve as evidence for reflection or reflective practice for both tutors and students. Apart from comments on lesson plans under self-evaluation, reflective practice is strange to the tutor and students. None of the anticipated reflective practice records was availed.

The researchers to develop an argument about the significance of the constructivism, provided consistency of the evidence in the light of the already existing knowledge and was used to appraise the reliability of the evidence obtained by assessing its truthfulness, biases, relevance of the source materials and representativeness in the body of knowledge.

Challenges that affect tutors application of the Constructivists principles.

The tutors are giving less to students but expecting them to think more and construct their own knowledge. The tutors revealed inadequate awareness of constructivists' informed teaching, knowledge construction and applicability of constructivism on many of the concepts. Many tutors have experienced a traditional instruction orientation and background which strains their adaptation to emerging shifts in teaching. This has been manifested in the difficulty in assuming new roles (facilitator), ICT integration in Instruction and taking on reflective practice.

Findings

The tutor's acceptance and practice of constructivist principles has been limited despite the evident benefits. There is difficulty in translating a theory of learning into a theory or practice of teaching, a conversion that has always been difficult. There is need for more acquaintance presented to tutors and students on constructivist teaching. Tutors rely on teacher-centered methods as they largely lectured and dictated notes to students and indeed rarely used instructional materials. Tutors defended the use of teacher-centered methods that they save time and enable students to get good grades in the final examinations. The tutors claimed to be using learner-centered methods of teaching such as demonstration, group work, conducting practical's and use of instructional materials. The college administrators who assume that all tutors know what to do not aware that very many of these are not grounded in primary school methods, use of ICT and integrating constructivists' principles.

Student teachers spend most of their time learning theory while at college, rather than learning how to teach. The tutors have a task to transform students' engagement in content from rote recall and comprehension to more meaningful analysis, synthesis, application, and evaluation via constructivist teaching models and methods. The study reveals that tutors rarely get feedback on their teaching performance and of all constructivists' practices, reflection does not feature and yet in modern teaching it vividly improves both individual and group performance.

Implementation of ICT in colleges is a big challenge due to high cost incurred for acquiring, installing and replacement of latest software and addition to that; various opportunity costs to colleges for infrastructure development. Besides the lack of infrastructure to accommodate the technology, problems of electricity, network availability, lack of awareness towards technology and utilization technology with improper knowledge add complexities for the successful implementation of ICT in colleges. Development of e-content, its dissemination, selection and evaluation requires large scale networking among the users and producers and intellectual property rights

among the stake holders is also a major concern for the holistic integration ICT in education.

The colleges are in a nascent stage in the integration of ICT in education because many are accustomed with traditional learning practices and lack of motivation and knowledge among tutors to adopt ICT in teaching. To many tutors and students in Uganda, the computer and the Internet are still a mystery. This situation is even worse in the rural areas, where the majority of Ugandans (about 80 per cent) live without electricity and connectivity to the global information network.

Connect-ED in Primary Teacher Colleges made an attempt using technology to enable and enhance learning and teaching for primary educators through the creation of multifaceted approaches to integrating media and computers in the Primary Teacher Colleges (PTC). They accomplished this by setting up Education Technology Centers at 8 core PTCs to increase access, availability, and provision of relevant and quality learning materials and support for teacher professional development. This program was funded and supported by United States Agency for International Development under the Education for Development and Democracy initiative. (USAID – EDDI).

Final reflection

ICT is an important curricular resource and an important part of education. Taking critical perspective on ICTs as well as promoting constructivist approaches that privilege participation and co-operation over mere access to principles that the course will help teachers to explore. Managers of TIET institutions were advised to encourage teachers and students to acquire ICT skills. The benefits of such skills are enormous. It was advisable that all managers of education institutions acquire a copy of the ICT policy and internalize its provisions (MOES, 2010). Obtaining a copy of ICT policy and its acquaintance is not a justification for implementation. The levels of ICT integration in colleges is still low evidenced with almost no interaction during COVID 19 lockdown unlike other sections of the system that managed online teaching.

ICT's are technologies along with developing such understanding the course will help student teacher to learn integrating technology tools for teaching and learning material development, developing collaborative network for sharing and learning. This will address traditional challenges of teacher education and need for adequate and appropriate learning material. ICTs can be adopted to support decentralized structures and processes, as well as build the 'digital public' to make education a participatory and emancipator process. Tutors should integrate ICT in assessment practices and in the preparation of teachers for primary schools. Introducing teachers to new technologies for teaching and learning can support a change in teaching practices (Lawless & Pellegrino, 2007).

Recommendations for Future Research

Aware of the rapid development of information and communication technologies (ICT) and the experience of the instructional challenges during the Covid 19 lockdown, the researcher recommends for an in depth study on the use and integration of ICT in education particularly in the colleges and higher education. The current aspirations and instructional shifts in education must strongly align to constructivists' ideologies of which reflective practice has emerged to be a more pronounced strategy through which the desired practices can be effectively addressed as well as realizing the aspirations of the 21st century. The study exposes that reflective practices are not common in the colleges and yet vital in the constructivists informed teaching which also is relevant in the 21st century. The researcher devises a reflective practice laboratory for all colleges as a strategy to hasten instructional shift and adaptation to the demands of lifelong learning of our current times as well as realizing future aspirations.

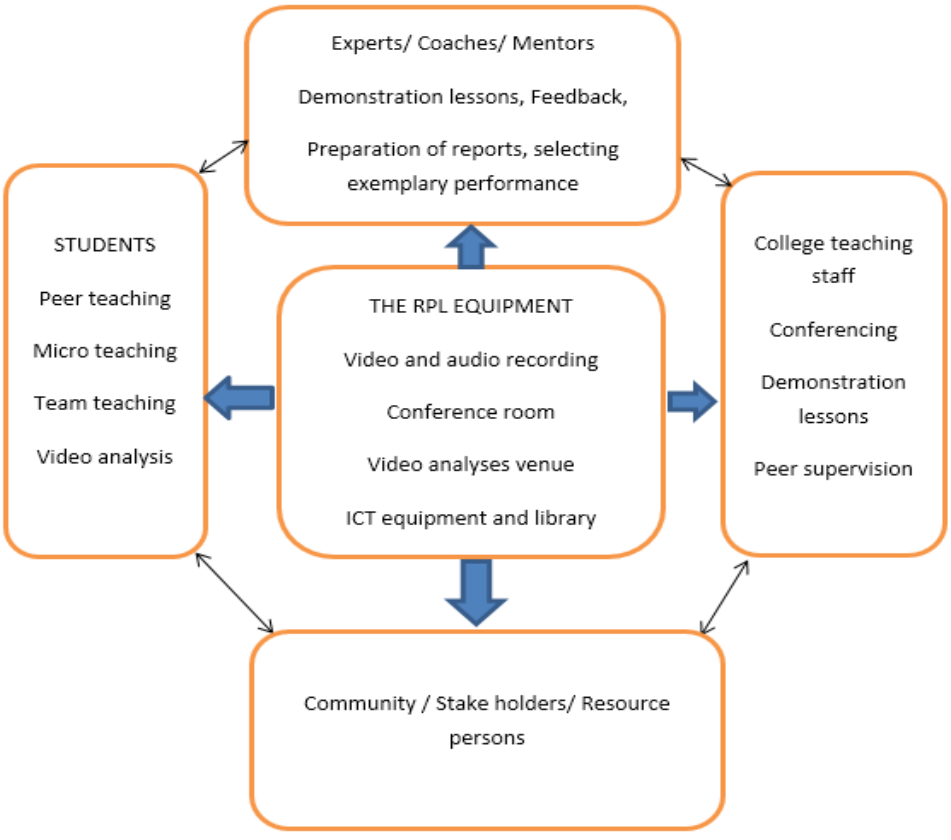

Figure 1: The Reflective Practice Laboratory (RPL)

Elements of the Reflective Practice Laboratory

Reflective practices in education have in many ways shown to have value as these allow students to reflect on their learning experiences within a blended learning environment. Reflective practices are therefore seen as a learning strategy whereby professionals become aware of their implicit knowledge base (Herrington et al, 2010).

The reflective practice laboratory conference room will serve as an appropriate venue for attending professional conferencing practices, inductions, seminars, demonstrations sessions and practice in the use of educational technology, internet and other digital forms which are effective when developing a teacher. The use of ICT and reflective practice integration will allow active participation, collaboration and engagement (Gachago et al, 2013).The knowledge and skills needed in a digital age, where all 'content' will be increasingly and freely available over the Internet, requires students with expertise. Technological and electronic media can be fused with student-centered technological approaches that are meaningful and conducive to the ways in which today's learners engage with life-world environments (Bozalek et al, 2013; Herrington & Kervin, 2007).

Relevant ICT skills to acquire through the Reflective Practice Laboratory.

The 21st century teacher who is evenly grounded in constructivists' teaching must possess several skills that the reflective practice laboratory is likely to offer which include; word processing skills, spread sheet skill, data base skill, electronic presentation, Web navigation, web site design, skills for audio recording, skill of using digital camera, e-mail management, computer Network knowledge applicable to teacher education system, file management &windows explorer skills, downloading software from the web(knowledge including e Books, Installing computer software onto a computer system, web ICT or blackboard teaching skills, video conferencing skills, computer-related storage devices, scanner knowledge, knowledge of PDAs, deep web knowledge, educational copy right knowledge, computer security knowledge .

The relevance of Video and Audio Recording in the Reflective Practice Laboratory.

Through a process of video and audio recording, describing, analyzing, and interpreting the teaching, both the tutors and student teachers can develop an awareness of and learn more about their own teaching. This practice is strongly supported by De Monte (2013) whose research affirms that student teachers who received specific feedback to videotaped teaching shared with an instructional coach had higher achievement gains than students' teachers not receiving coaching.

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