

The Role of Instructional Coaching in Video-annotated Peer Review of Classroom Instruction

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The Role of Instructional Coaching in Video-Annotated Peer Review Process

The process of faculty observing fellow faculty within the practice of teaching and providing comments on perceptions and effectiveness of specific practices has been used throughout higher education as a means to refine instructional practice through formative feedback and summative evaluations (Blackmore, 2005). The peer review process can be used as a change mechanism that provides faculty with an opportunity to strengthen good instructional practices and disseminate alternative and evidence-based instructional techniques (Blackmore, 2005). Traditionally, the peer-review process has involved one faculty peer observing another faculty peer's classroom by physically attending the class and providing feedback after the class session (Bernstein, Jonson, & Smith, 2000). An alternative to this traditional format of peer review involves the video and audio recording and review of class sessions using an asynchronous video-annotated peer review (VAPR) process.

In traditional faculty peer review, local centers of teaching and learning frequently coordinate the peer review and provide guidance on the practice, however they are limited in their ability to attend each class. The asynchronous application of VAPR allows teaching and learning experts (TLE) to observe many class sessions at their convenience. Through this involvement, the TLE assumes the role of an instructional coach rather than a traditional dissemination outlet for instructional practices commonly associated with local campus centers of faculty development. Building on prior work regarding the types of comments made by faculty in VAPR (Pembridge, Allam, & Davids, 2015), this paper examines the role of the TLE as an instructional coach within VAPR and how their participation influences the feedback provided by fellow faculty peers involved in the process.

Video-Annotated Peer Review

The VAPR process is an approach developed to engage faculty in change strategies, described by Borrego and Henderson (2014) that align practices across Henderson, Beach, and Finkelstein (2011) quadrants of change (i.e., curriculum and dissemination (I), reflective faculty (II), and shared vision (IV)) to support institutional change associated with teaching. The process has been designed to engage a community of practice of engineering faculty to review each other's practice of teaching as a means to enhance the diffusion of evidence-based instruction (Davids, Pembridge, & Allam, 2015).

The process begins with the object of review (OoR) selecting and video recording a class session for which the OoR would like to receive feedback. The video is then uploaded to a video annotation software package that allows for reviewers of the class session to provide feedback on the video at specific timestamps linked to corresponding segments of video. The software supports the capability for the reviewer and OoR to review the video and comment at the same time, thus contextualizing the feedback. Once uploaded to the software the OoR provides a pre-observation reflection, where the OoR discusses the course goals, identify specific learning objectives, and identify any successes and concerns of that class session which the OoR would like the reviewer to address. In traditional faculty observation and structured peer review

processes these details are discussed face-to-face during a pre-observation consultation. Within VAPR, these details are annotated at the 00:00 timestamp of the video.

Once the reflection statement is added to the video the OoR sends the video to the TLE who then provides expert review of the class. In addition to traditional instructional feedback, the TLE is tasked with identifying observed implementations of evidence-based instructional practices (i.e. active learning, cooperative learning, think-pair-share, etc.) and opportunities for their inclusion. Following the TLE, sequentially, two additional faculty review the video and are privy to the pre-observation reflection statement, the comments from the TLE, and any other reviews or annotations that preceded their own reviews. The peer reviewers are provided a table of instructional attributes, adapted from Berquist and Philips (1975) to guide their review (Table 1). The reviewers are also provided a list of evidence-based instructional practices and their operational definitions.

Table 1. Table of attributes used to guide peer-review.

Instructor's Organization (*The instructor...*)

- presented the material in an effective, organized manner.
- presented the material at an appropriate level for the course and students.
- provided clear, concise examples and visual aids to clarify the material.
- used technology, to improve course delivery or facilitate activities.

Instructor's Knowledge of Subject Matter (*The instructor...*)

- illustrated command of the subject matter.
- presented material that was important and current.

Clarity and Pace of Instruction (*The instructor...*)

- defined new terms or concepts.
- elaborated or repeated complex information.
- made explicit statements drawing student attention to certain ideas.
- spoke in a voice in an audible voice with clear enunciation.
- avoided distracting mannerisms.
- spoke at a pace that allowed students to take notes, if applicable (PowerPoint or notes may be available)
- paused during explanations and after asking questions.
- provided explicit directions for assignments.

Instructional Atmosphere (*The instructor...*)

- conveyed enthusiasm for the subject and appeared engaged in the instruction.
- conducted the class so that students felt comfortable to ask questions.
- varied the tone and pitch of voice for emphasis and interest.

Instructor's Professionalism (*The instructor...*)

- arrived to class on time.
 - answered questions respectfully, avoiding condescension, treating students with respect.
 - dressed in a professional manner commensurate with the subject matter profession.
 - appeared confident, demonstrated command of the classroom
-

The VAPR process allows the faculty reviewers to benefit from the review process as a means to review another's teaching, but to also gain insight into multiple perspectives including the expertise of the TLE. Once all reviews are complete, the OoR then reviews their own video with the comments and writes a post-observation reflection in the final minute timestamp of the video. In traditional faculty observation, the comments and post-reflection occur during a debriefing, where the instructional coach or peer takes notes during the review process and discusses what was observed in a face-to-face meeting. The limitation in the traditional review is that many of the comments are de-contextualized from the actual practice. The use of VAPR provides a contextually relevant approach to faculty development that addresses a need for discipline-based feedback on teaching.

Faculty Development and Instructional Coaching

Professional development is critically important within engineering education, as many engineering faculty receive no formal training in education or instructional techniques (Felder, Brent, & Prince, 2011). As a result, much of the teaching approaches used by engineering faculty come from their personal experiences as a student (Lortie, 1975; Shulman, 2005; Entwistle, Skinner, Entwistle & Orr, 2000). As a result, formalized discipline-specific professional development for engineering education becomes critically important to address outcomes-based accreditation, changes in student attributes and demographics, as well as advancements in instructional technology and cognitive science that have led to scholarship of teaching and learning, which in turn has generated evidence-based instructional approaches (Felder et al., 2011).

Within engineering education, Felder et al. (2011) note that traditional formats of professional development include workshops, seminars, learning communities, and consultations. These consultations can include individual consultations, mentoring, and partnering. Individual consultations are characterized as a faculty member having one or more one-one-one meetings with teaching and learning experts within the institution as a means to receive feedback and suggestions on improving instruction. Mentoring is characterized as a faculty member working with a more senior colleague for a semester or an academic year. In comparison, partnering involves a more peer-oriented approach where faculty peers informally agree to observing each other's classes periodically and discussing opportunities for improvement. VAPR integrates the approaches of individual consultations and partnering.

A recent trend in education (especially K-12) has focused on embedding educational coaching within institutions and cohorts of faculty. Rather than consultations, the coaching relationship is more personalized to the needs of the cohort. Educational coaching has been categorized into four main approaches: peer coaching, cognitive coaching, literacy coaching, and instructional coaching (Cornett & Knight, 2009). Generally, coaching puts the needs of the teacher at the focus of professional learning through individualization (Knight, 2009b; Teeman, Wink, & Tyra, 2010).

While there are some variation to the definitions and nomenclature of educational coaching, this paper will utilize the term "instructional coaching." Instructional coaching is described by Gallucci et al (2010) and Taylor (2008) as a non-supervisory role, where a coach influences

instruction through expertise and relationships rather than authority. Thus the role of the instructional coach is a non-evaluative and non-supervisory. As noted by Marzolf (2006) and summarized by Boatright and Gallucci (2008), a benefit of the coaching relationship is that it is based on the assumption that an outsider can provide new insight into the reform process to help renew educator practice. When used prominently, instructional coaching can support reform goals and participants can be perceived as change agents (Gallucci, Van Lare, Yoon, & Boatright, 2010; Dawson, Mighty, & Britnell, 2010). Changes in instructional practice require substantial professional learning that can be achieved through embedded professional development that instructional coaching offers (Gallucci, Van Lare, Yoon, & Boatright, 2010).

In practice, instructional coaches work with faculty to choose and implement appropriate research-based approaches to instruction to help students learn more effectively (Knight, 2009). This coaching can include aspects of teaching that include classroom management, academic content, instruction, and/or formative assessment (Knight, 2009). Within their actions, they facilitate the role of knowledge management where they connect teachers to relevant academic research and direct coaching with respect to differentiated instruction (Coggins, Stoddard, & Cutler, 2003). The majority of the role of the instructional coach involves classroom observation of classroom teaching, providing demonstrations of model practices, and pre- and post-observation conferences (Gallucci, Van Lare, Yoon, & Boatright, 2010). Within VAPR, the role of the instructional coach has the potential to fill these roles. Prior to reviewing the video, the instructional coach can review a pre-reflection of the OoR. Throughout the review they are observing the OoR's actions within the class and providing instructional feedback and suggestions. For the other faculty that are reviewing the OoR, the instructional coach can identify models of practice. Finally, they can review the post-reflection if appropriate.

As a research area, there is a need to define the role of the instructional coach and what describes and contextualizes the work of the instructional coach (Gallucci, Van Lare, Yoon, & Boatright, 2010; Taylor, 2008). This is especially concerning in the non-traditional interface of VAPR. Within this study, the inclusion of the instructional coach provides another contextual opportunity to examine what role the instructional coach plays in a virtual environment and how that affects the overall response from the community of practitioners engaging in the peer-review process. Therefore this study seeks to define the role of the instructional coach in VAPR by describing the comments made throughout a series of reviews and how that impacts both the OoR and the other faculty reviewers. The research questions are as follows:

- 1) What types of comments do instructional coaches annotate in peer review?
- 2) How do faculty peer review comments differ between sessions with and without instructional coach involvement?

Methods

This study examines a specific case of a cohort of faculty who are participating in the VAPR process on a continuous basis with the goal of incorporating evidence-based instructional practices in their regular courses. This study draws on two specific implementations of VAPR wherein: scenario 1) the cohort initially received feedback from the TLE, followed by two other

reviewers in the cohort; and scenario 2) the cohort did not receive any comments from the TLE and only received comments from two faculty peer reviewers. This study is a quasi-experimental design where annotated comments associated with selected videos of classroom session are used to examine the role of the TLE as an instructional coach.

Participants

The faculty cohort participating in VAPR is made of nine faculty in a first-year engineering program at a medium-sized private institution. Each term, the cohort conducts one round of VAPR that includes the selection and recording of a course, pre-observation reflection, review by peers in the cohort, and post-observation reflection. The participating faculty primarily teach courses within the department, but also teach engineering core courses and graduate courses outside of the department. The participants are all full time faculty ranging in academic rank from instructors to associate professors and four of nine participants are non-tenure track and only hold Masters degrees in a variety of engineering disciplines (Table 2).

Table 2. Profile of participating faculty.

Participant Demographics	N
<i>Faculty Rank</i>	
Associate Professor	3
Assistant Professor	5
Instructor	1
<i>Tenure Status</i>	
Tenure-track	5
Non-tenure track	4
<i>Highest Education</i>	
Ph.D.	5
M.S.	4
<i>Sex</i>	
Male	5
Female	4

The TLE has formal undergraduate and graduate degrees in engineering and education and has expertise with the identification and categorization of evidence-based teaching. The TLE's traditional role provides professional development that supports the inclusion of evidence-based teaching in engineering courses. The TLE was familiar with several faculty in the department and the institutional context prior to participating in the peer-review process as an instructional coach. As noted in the previous description of the VAPR process, the TLE was specifically tasked with identifying evidence-based instructional practices as means to model the technique for those reviewing the video and bring awareness of the implementation to the OoR. The TLE was also tasked with identifying opportunities to implement evidence-based instructional practices in order to achieve the goal of encouraging the diffusion and adoption of these approaches.

Data Collection

The primary source of data for this paper includes the time-stamped comments from the annotated videos recorded over two implementations of VAPR for all nine participants. The comments include pre and post observation reflection statements, comments from the TLE, and the peer comments from two other faculty in the cohort assigned to review OoR's on a rotating schedule. Through the annotation software, all comments made on the video are exported to text files with the exact comments and the identification of the individual who made the comment.

Data Analysis

Each of the review comments from the faculty peers and TLE were a priori coded for feedback given based on the types of teacher knowledge the comments address. Since the role of the instructional coach is to enhance the knowledge of the instructor, the comments were coded for seven types of teacher knowledge operationalized by Shulman (1986). The types of knowledge include: subject matter knowledge (SMK), pedagogical knowledge (PK), pedagogical content knowledge (PCK), curricular knowledge (CK), knowledge of the learners (KoL), knowledge of educational context (KoC), and knowledge of educational ends, purposes, and values (KoEP&V). The comments were coded by two researchers following the specified coding scheme included in Table 3. Any discrepancies in the codes were re-evaluated by the research team until an agreement on the code was achieved.

Table 3. Coding scheme for types of teacher knowledge adapted from Shulman (1986)

Code	Code definition (<i>comments made with respect to ...</i>)
Subject Matter Knowledge (SMK)	what the instructor is presenting in terms of facts and conceptual knowledge of the course content.
Pedagogical Knowledge (PK)	how the instructor utilizes generalized approaches to instruction, class management, and organization of instruction.
Pedagogical Content Knowledge (PCK)	how the instructor is utilizing instructional techniques and organization that is specific to specific subject matter.
Curricular Knowledge (CK)	the course outcomes and requirements and course materials and resources.
Knowledge of Learners (KoL)	perceptions of student cognitive and affective characteristics that can include motivation and pre-requisite knowledge.
Knowledge of Educational Context (KoC)	the physical classroom environment and the institutional culture.
Knowledge of Educational, Ends, Purposes and Values (KoEP&V)	how the purpose of the course fits into the overall curriculum and what outcomes beyond course outcomes should be achieved.

The frequencies of the codes were quantified for their occurrence in each of the reviewed classroom sessions. An aggregate average was calculated for TLE comments across all videos, peer faculty comments in the reviews with the TLE, and peer faculty comments in the reviews without the TLE. Descriptive statistical comparisons were then made between the two peer review scenarios.

Findings

Types of TLE comments

Throughout the reviews, the TLE provided comments for each type of teacher knowledge with the exception of subject matter knowledge (SMK) (Figure 1). The highest percentage of comments, 65%, made by the TLE across all courses observed, addressed general pedagogical knowledge (PK). These PK comments addressed both norms and propositions of teaching, most commonly focused on the pace of the course, ensuring student engagement, and practices that ensured students would retain the knowledge they developed in class. In addition, on average 13% of the TLE comments addressed pedagogical content knowledge (PCK). These comments directly addressed empirical and propositional best practices on how to teach a specific topic within a specific course.

In comparison to the TLE, faculty reviewers in the same set of observations, made 45% of their comments about pedagogical knowledge and 18% of the comments about pedagogical content knowledge. The slight increase in percentage of PCK comments may be reflective of the faculty peer-reviewers having more history teaching those specific courses and passing down knowledge that they have gained about how to effectively address a topic. The other area of differentiation between the TLE and faculty peer reviewer was observed with comments addressing knowledge of the learner (KoL). The faculty peer reviewer group made more comments, proportionally, than the TLE. This finding may also be due to the faculty having a higher familiarity with the type of student enrolled in the observed courses and therefore more insight to share in this realm than that held by the TLE.

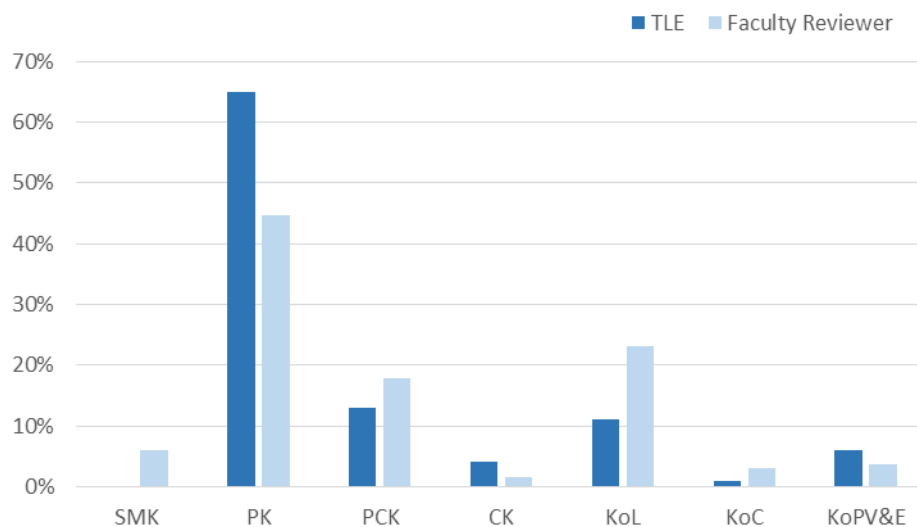


Figure 1. Average percent of comments associated with types of knowledge made by teaching and learning expert (TLE) and faculty reviewers.

Disseminating evidence-based instructional practices through TLE comments

As part of the VAPR process, both the TLE and the faculty reviewers have the capability to tag sections of instruction as an evidence-based instructional practice (EBIP). Through tagging of comments, reviewers can identify whether the practice is being used in that video segment or if there is an opportunity to apply an EBIP at that specific moment in the class. With the TLE involved in the review process, the TLE typically identified two to three implementations of evidence-based instructional practices in each class session being reviewed. Commonly the TLE noted the use of active learning. For the faculty participant cohort examined in this study, the use of active learning is common across all courses taught. However, there is significant variation in specific approaches in the use of active learning. Through the identification of the evidence-based instructional practice, the TLE acting as an instructional coach is capable of modeling the use of a specific EBIP in a relevant course context and can do so with greater credibility as it is currently being used by one of the reviewer's and OoR's colleagues. In addition, the TLE provided suggestions on how that approach can be adapted across other contexts. An example of this is the following comment, where the TLE identified a use of active learning and justified its use:

“Students actively completing an activity in class while being able to ask questions is a great way to engage your students and have them work through the course content.”

Another example of modeling is illustrated in the following comment where the TLE identifies the use of concept-tests and explains how it is being used and offers additional suggestions for its implementation:

“I can't see the poll, but I'm guessing that this is a multiple choice question that allows students to lock-in a response to the question that tests a concept from the course. Then

the responses and correct answer will be discussed - so this is a concept test. I would recommend reading the question for the poll, just to make sure everyone is focusing on it. I would recommend having a few students tell the class why they chose the two most popular responses before revealing the correct answer.”

In addition to modeling evidence-based teaching through the identification of it in practice, the TLE also noted opportunities where EBIPs can be included in the current practice. Oftentimes these approaches advance the instructors usage of evidence-based instructional practices beyond active learning. These types of suggestions occurred two to three times in each of the class sessions reviewed by the TLE. Several of the comments aligned with institutional reform goals to increase the use of inquiry learning, as seen in the following TLE comment:

“Giving the students class time to "play with" the course content is a great way to allow them to really explore the concepts on their own while resources (you and your TA) are available (as I think I said earlier), but it's also really great to have them do this as the only activity which really forces them to try to work through the course content and make it work.”

Aligning with prior studies of instructional coaches, the TLE directly addressed comments and concerns made by the OoR during the pre-observation reflection. This confirms the necessity of including a pre-observation reflection in the VAPR process to ensure the TLE addresses the needs of the faculty. The following two excerpts from the TLE comments address concerns from two separate OoRs who noted they were concerned about the students having difficulty with the course content and keeping the students engaged:

“Since you had a feeling your students were going to have some trouble with the course content for this class, it may have been a great opportunity to use Just-in-Time-Teaching. You could have your students complete a quick assessment or muddiest point (what is the muddiest point for you with fprintf?) before coming to class. You can then review the materials and cater your lecture to ensure you are meeting all of their concerns.”

“Some of your students seem to be losing steam (putting thier heads on their desks and fidgeting quite a bit), this could be a great time to bring in something to force the students to re-up their attention and engagement (a quiz, think-pair-share, general active learning, etc).”

When the TLE was involved in the review process, faculty peer reviewer identification of evidence-based instructional practices was low. During those reviews involving the TLE, only one of the nine participants, who has a background in education, provided suggestions on where these instructional techniques could be implemented in each of the course sessions they reviewed. However, none of the participants included identifications of EBIP application in the classroom beyond that which was identified by the TLE.

In comparison to when the TLE was not participating in the review process, only two of the participants, both with backgrounds in education, provided suggestions for three of the classroom sessions observed, and only identified them for modeling purposes in two of the classes. In those

comments by the faculty peer reviewers, their comments are vague and question the validity of the approach in that specific interaction in comparison to the suggestions made by the TLE. The following annotation excerpts from faculty peer reviews without TLE participation illustrate those differences:

“I do this all the time. I get tired of using TPS and tell them to just collaborate and discuss. Im not sure if there is any major issue with this. Just something i noticed.”

“Video on designing for assembly / repair / maintenance / longevity / upgradeability / recyclability / sustainability. Relates their project to "real" or industry considerations. However, is there a way we can get these students to reflect on the video? Perhaps have them get together in there project teams to discuss how to apply these concepts in their own improved redesigns? Then share with the class?”

Based on the comparison of these two scenarios, the inclusion of the TLE encourages the diffusion of evidence-based instructional practices through modeling and additionally provides suggestions for their implementation in an immediately relevant context. In contrast, when the TLE is excluded from the peer review process, faculty provide a less compelling argument for their use.

TLE impact on faculty reviewer comments

Overall when comparing the number of comments that faculty made when the TLE was present in the review process and when the TLE was not involved in the processes, there was an average increase of 54% in the number of comments made by faculty peer-reviewers. When the TLE was present the average number of comments per hour of instruction for any of the participants was 12.6 (standard deviation = 3) and when the TLE was not present 19.5 (standard deviation = 10) (Figure 2). Due to the low N of participants, there is a high variability of comments made during the process without the TLE participating in the review. Despite this variation in the frequency of comments, the proportional focus of the comments did not change when analyzing comments for types of teacher knowledge addressed by the faculty. While the overall number of comments decreases with TLE involvement, the faculty reviewers continue to primarily comment on general pedagogical issues, followed by pedagogical content knowledge, and knowledge of the learner (Figure 3).

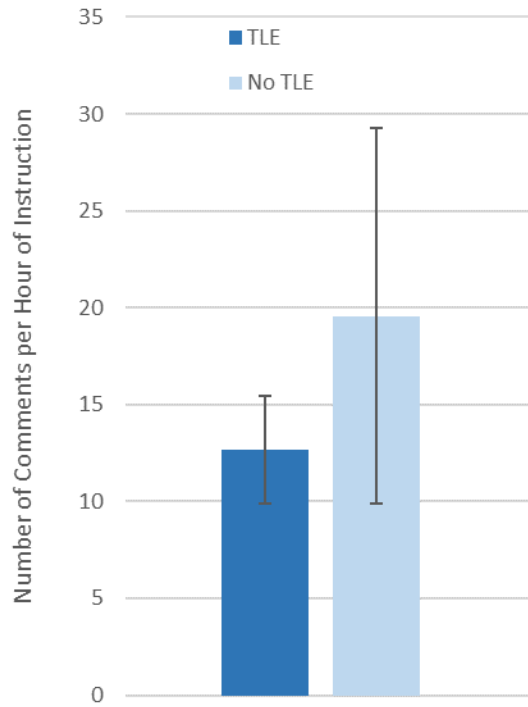


Figure 2. Difference in average number of comments made by faculty reviewers, with standard deviation bars, per observation between sessions when the teaching and learning expert (TLE) was involved and not involved.

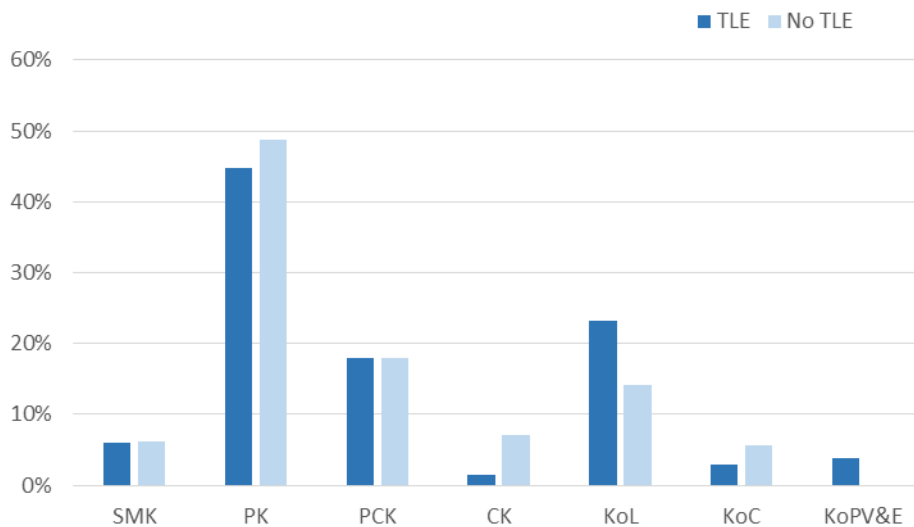


Figure 3. Comparison of average percentage of knowledge comments between peer review with teaching and learning expert (TLE) involvement and No TLE

Conclusions

With focus on the goal of encouraging the use of evidence-based instructional practices, the findings of this study illuminate the need to include teaching and learning experts in the video-annotated peer review process. While faculty peers can provide substantial feedback that address issues regarding subject matter knowledge and pedagogical content knowledge, the TLE can serve as valuable dissemination source of relevant research in the field of engineering education and is uniquely situated to integrate this knowledge within the context of a specific course; directly closing the research-to-practice loop identified by Jamieson and Lohman (2009).

Additionally, the inclusion of a TLE as instructional coach can begin to set the tone of the change that an institution seeks by supporting the TLE as a change agent (Dawson, Mighty, & Britnell, 2010). Through continued participation in the VAPR process it is possible for the TLE to guide a transformation towards specific instructional reform efforts. The large study from which this data was obtained will subsequently explore how the VAPR process as a whole addresses a faculty cohort's desire to implement more evidence-based instructional practices in their regular class sessions.

While TLE participation in VAPR provides a valuable resource for the dissemination for evidence-based teaching and general pedagogical knowledge, the inclusion of the TLE can also limit the sharing of practices from peer-to-peer. As shown in the findings of this study, when the TLE provided the first round of comments the follow-up peer reviewers provided fewer comments. When the reviewers include comments at the same time stamp in the video as the TLE, they were generally agreeable with the TLE. During follow-up interviews, not addressed in this study, faculty participants noted that they had difficulty adding comments because many of their insights were already mentioned by the TLE. Several of these participants felt that the TLE said what they were thinking but at a stronger scholarly quality. While TLE can provide a scholarly credible source of information on the use of evidence-based teaching, comments from peers may appear to be more credible and relatable.

In past studies of instructional coaching, a competing tension was identified between the instructional coach and their own agenda versus needs identified by the faculty member (Gibson, 2005). Within the VAPR project, a similar tension is acknowledged, where the VAPR project is focused on the diffusion of EBIPs and that was identified as the TLE's primary role. In follow-up interviews faculty indicated that some suggestions felt forced and they would have welcomed general suggestions to their overall approach to teaching. As a guide to future instructional coaches involved in a VAPR process, the Gibson (2005) study identified key propositions and themes that describe the role of the instructional coach that may be applicable to the VAPR context:

- Coaches should try not to address everything that a teacher could improve in any one coaching session
- Coaches need to know how to identify a specific focus for their teaching discussion (feedback) that will best help the teacher move forward.
- The coach should not give his/her own opinion as to what the teacher should do
- Coaches should guide teachers to figure out for themselves where and how their teaching should improve.

Utilizing these approaches, the role of the TLE as an instructional coach can be used to further support the reflective practice of the instructor (Gibson, 2005) rather than directly offering suggestions for improvement.

As a research area, the data presented here represents a small subset of an ongoing case study examining the implementation of VAPR within a faculty cohort. While this study and others have categorized the role of the instructional coach, or TLE, Teeman, Wink, and Tyra (2010) emphasize the need to examine the effectiveness of approaches to instructional coaching in improving instruction and student learning. Additional studies of VAPR are forthcoming that will document the role of the TLE in supporting the concern of use and implementation of evidence-based instructional practices.

Acknowledgement

The authors would like to gratefully acknowledge the National Science Foundation for their support of this work under the TUES program (DUE # 1244852). Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not reflect the views of the National Science Foundation.

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