Collaborative professional development for teaching assistants - a scholarly approach to facilitating university students' exploratory talk?

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Abstract
A teaching course for PhD-students working as Teaching Assistants (TAs) has been iteratively developed to have two consecutive modules. The TAs emphasise a high degree of outcomes, and demonstrate a developing reflective approach. Role-plays at course-days and a "teaching-in-practice" assignment have however indicated that the TAs struggle to facilitate students' exploratory talk in small-class teaching. They tend to focus on "the correct answer". A potential third module with collaborative teaching-observations has therefore been tried out.

Introduction

Based on research from the field of university teaching it must be seen as essential to assist early career academics in developing their teaching practice (Kane, Sandretto & Heath, 2004). Kane et al. (2004) emphasize the role of reflective practice in developing teaching excellence at the tertiary level, and there is a general research consensus supporting that effective teacher professional development should focus on teaching and learning of subject matter, i.e. the content from the science disciplines, and that teachers need to work collaboratively with inquiry based learning over time (Desimone, 2009). So, it is essential that university teachers are encouraged to inquire into own practice and student learning: a scholarship of teaching and learning (Kreber & Cranton, 2000).

Most PhD-students at Science & Technology, Aarhus University, Denmark work as teaching assistants (TAs), as a subsidiary occupation beside their career as researchers. In most cases the PhD students have no prior experience as teachers, and we have therefore offered an introductory teaching course since 2009. The course has been developed in iterative cycles of design, enactment, analysis, and re-design (Barab & Squire, 2004). So - the notion "a scholarly approach" in the title of this paper both refers to this approach to educational development and course design, and to the aim of supporting the TAs in the first steps of their scholarship of teaching and learning. The PhD students can at the moment take one or two modules (overview in figure 1). Module 1 is offered three times/year and Module 2 two times. Each module is taught as three full course days over 3-4 weeks with assignments before, after and in-between course days. In one of the assignments in Module 1, "video-teaching", the participants design a teaching activity relevant for their field of science, describe the learning goals, and try it out in a videotaped role-play with peers. This is among other things used in peer-feedback sessions. In the subsequent assignment "teaching-in-practice" they need to design a teaching activity to meet a particular challenge they identify, try it out in their own teaching or with a peer, collect some data on the effect and reflect on the results together with a peer, and finally describe what they have learned and what they will do in the future.
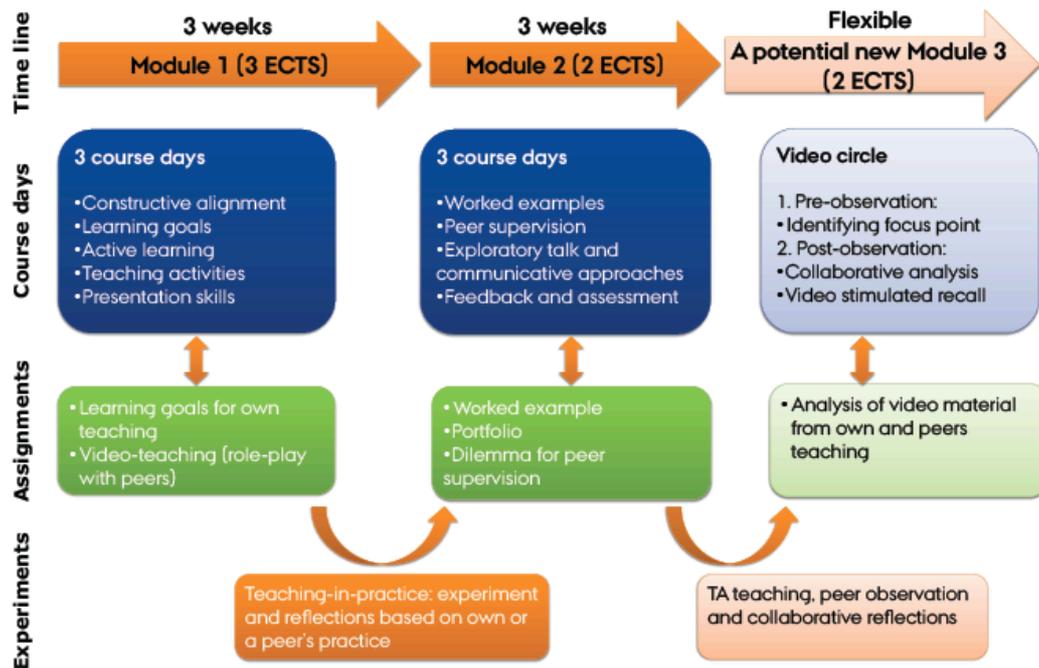
Figure 1. An overview of the introductory teaching course for teaching assistants (TAs) with the two present consecutive modules. A potential new flexible module 3, organised as a video-circle, is shown semi-transparent to the right. This is discussed below.

The research presented focuses on evaluation and assessment from Module 1, the re-design of the course, and how the course might help the TAs in taking the first steps towards a scholarly approach to their teaching. Evaluation of steps towards a scholarly approach is based on the TAs' competences in backward designing teaching based on learning goals, with reference to constructive alignment (Biggs & Tang, 2007), their reflective approach (teaching-in-practice), and their competences in facilitating university students' active learning and exploratory talk. Using various communicative approaches and supporting students' exploratory talk, e.g. both hands-on and minds-on in the science laboratory, are known to be important focus areas in the field of science (Mortimer & Scott, 2003). The research questions are:

RQ1. Which outcomes do the Teaching Assistants (TAs) report from module 1, and how can the course be re-designed based on evaluation and assessments?

RQ2. How do the TAs use exploratory talk in their role-plays, and which discussions do they raise in relation to the role-plays?

RQ3. Which enactments concerning facilitating exploratory talk are observed in the TAs post-course practice and which discussions are raised during collaborative post-observation reflections?

Method

The overall design is mixed methods (Creswell & Clark, 2007). The interventions, and the data-collection framed by the interventions, followed the rhythm of design-based research (Barab & Squire, 2004).

RQ1 is answered using both quantitative and qualitative data: questionnaires from all participants from three repetitions of module 1 supplemented with analysing the assessments

of the video-teaching and teaching-in-practice assignments. Multiple qualitative data are used to answer RQ2 and RQ3. Concerning RQ2 this includes video from role-plays and from discussions during course-days. In relation to RQ3 three TAs following the first two modules volunteered to participate in a video-circle with two educational developers. The focus was before observation decided to be communicative approaches and exploratory talk. Two hours of teaching from each TA were observed by peers and staff and video-recorded. Collaborative post-observation reflections were organized as rounds of all participants raising issues based on evidence from the video. This was initiated and summed-up by the TA being observed. Data includes video from the TA's teaching and audio from post-observation reflections.

Quantitative data from questionnaires were analysed by frequency. Qualitative data – video, audio and open answers from questionnaires - were categorized following the procedures of content analysis (Cohen, Manion & Morrison, 2007). To answer RQ3 TAs' reflections were also categorized based on various theoretical aspects (triangulation). One analysis identified *content*, *process* and *premise* reflection (Kreber & Cranton, 2000), and another *technical*: e.g. focusing on skills needed to transmit information, *descriptive*: giving reasons for actions taken, *dialogic*: hearing own voice exploring alternative ways to solve problems in a professional situation, or *critical*: taking into account social, political and cultural issues (Kane et al., 2004).

Findings and discussion
Course-evaluations from three repetitions of module 1 have revealed quite a high level of self-reported outcomes. In figure 2 the TAs' answers to their overall perceived outcomes are summarized.
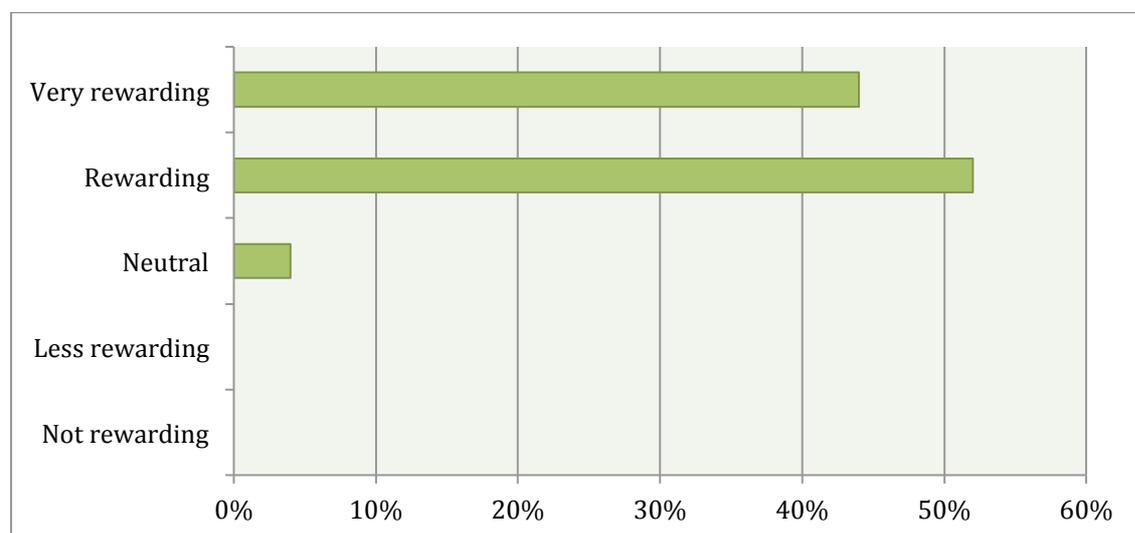

Figure 2. Course evaluations summarized from three repetitions of module 1

Below are examples of the various kinds of open reflections from the questionnaires:

> ....I feel more confident about teaching now....

> ...it was the first course in my educational career where students were indeed the most important part...

> ...other TAs have the same challenges as myself...

...I will align my teaching with the learning goals…

… video-teaching showed what I need to work on…

...evaluating own and peers video forced me to articulate my thoughts about teaching methods and their effects…

One of the TAs mentioned that the course made her start thinking as a teacher, and the TA's reflections indicate a burgeoning awareness about how to design teaching for learning. Several of them in their reflections in the questionnaire or in their assignments referred to realizing how important it is to be explicit about learning goals, at course-level, but also when designing activities for small-class teaching. In the teaching-in-practice assignments they, based on explicit learning goals, designed concrete activities to support university students' active learning in the various fields of science. Their reflective work with data on student learning, like one-minute papers and questionnaires, in these assignments indicated that they are in a process of developing competencies in the field of reflective practice. This can be seen as an important first step towards a scholarship of teaching and learning. An analysis of the video-teaching assignments however also highlighted, that the TAs, when managing student activities in the video recorded role-plays (the video-teaching assignment), tended to focus on quickly reaching "the correct answer". Referring to a social constructivist view on learning the TAs apparently need additional skills in setting up collaborative learning where their students formulate initial ideas and sort these based on their own reflection. This was among the reasons for including experiments with exploratory talk and communicative approaches in the re-designed Module 2 (figure 1).

The video-recorded role-plays from module 2 further illustrated that it was not an easy task for the TAs to use questioning to initiate exploratory talk instead of promptly giving the correct answer or using question-answer routine for seeking the answer. It was however evident that the TAs struggled to develop own questioning techniques and the discussions raised indicated that the role-play made the TAs reflect, and supported them in wanting to use this in their teaching practice.

Based on these findings, and to further support TAs competencies in facilitating exploratory talk, we are currently developing a new module 3 with a focus on video-observation and post-reflection in a group of TAs and educational developers from the Centre for Science Education (figure 1). A proto-design of what we so far call a *video-circle* has been tried out with three TAs after they have taking both module 1 and 2. Previous research has shown that teachers' reflective observations can potentially be developed by peer-inquiries in a video-club (Sherin & Han, 2004), but it is also known that novices might gain most from a scaffolded approach (Kane et al., 2004). This is the reason for suggesting collaborative analysis in a group with both peers and educational developers as in research-circles (Persson, 2009). Video excerpts from the three TAs' teaching confirmed that they all experimented in own practice with ways to initiate and facilitate dialogue among the university students. They used various communicative approaches and questioning techniques discussed in Module 2. The TA who was observed initiated the collaborative post-observation reflections. These opening remarks were characterized by being partly descriptive and partly dialogic. Dialogic reflections were in particular about process (how to foster student learning). They referred to concrete interactions seen on the video and explained what they did and why, but also explored alternative ways they might have facilitated student dialogue in these situations. The

TAs nuanced understanding of these incidents apparently developed along the discussions - evident when the TA being observed summed up at the end of the session.

After participating in the video-circle the three TAs emphasized inspiration from peers and feedback from professionals in an open and equal dialogue as highly rewarding. This issue about feedback and respectful interactions with the educational developers appear to be parallel to general elements of good teaching at the tertiary level (Kane et al., 2004).

Practical implications

The experiences from the iterative process of designing and re-designing a teaching course for early career academics, illustrates how *our* scholarly approach as educational developers have given us new insight into how best to support early career academics in taking a scholarly approach to *their* teaching and student learning. The focus on both the teaching assistants' self-reports, their reflections, and the thorough analysis of challenges seen in their enactments in role-plays and in teaching in practice, helped us realise that we need to take a broad spectrum of initiatives to support them in developing competencies in facilitating university students' exploratory talk. A scholarship of educational development includes both the data-based work on continuous improvement: designing, evaluating and redesigning a course like this, but also examining how best to engage the early career academics in ideas about teaching, and how to provide feedback in a dialogic process.

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