

ORIGINAL ARTICLE

Promoting reflection by using contextual activity sampling: a study on students' interprofessional learning

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Abstract

Students' engagement and reflection on learning activities are important during interprofessional clinical practice. The contextual activity sampling system (CASS) is a methodology designed for collecting data on experiences of ongoing activities by frequent distribution of questionnaires *via* mobile phones. The aim of this study was to investigate if the use of the CASS methodology affected students' experiences of their learning activities, readiness for interprofessional learning, academic emotions and experiences of interprofessional team collaboration. Student teams, consisting of 33 students in total from four different healthcare programs, were randomized into an intervention group that used CASS or into a control group that did not use CASS. Both quantitative (questionnaires) and qualitative (interviews) data were collected. The results showed that students in the intervention group rated teamwork and collaboration significantly higher after than before the course, which was not the case in the control group. On the other hand, the control group reported experiencing more stress than the intervention group. The qualitative data showed that CASS seemed to support reflection and also have a positive impact on students' experiences of ongoing learning activities and interprofessional collaboration. In conclusion, the CASS methodology provides support for students in their understanding of interprofessional teamwork.

Keywords

Collaboration, content analysis, interprofessional education, interprofessional practice, interviews, mixed methods, team-based practice

History

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Introduction

Clinical education is undergoing changes as a consequence of the increasing awareness of the importance of collaborative teamwork among healthcare professionals (Reeves, Perrier, Goldman, Freeth, & Zwarenstein, 2013). More focus is therefore put on interprofessional collaborative training since it is necessary for students to learn how to effectively communicate in teams for safe and effective patient care (Barr, Koppel, Reeves, Hammick, & Freeth, 2005; Varpio, Hall, Lingard, & Schryer, 2008). One way of providing healthcare students from different educational programs with this type of training is to offer interprofessional clinical placements on hospital wards (Gilbert, 2013; Ponzer et al., 2004; Reeves et al., 2010). It has been shown that work-based learning is fundamental to undergraduate medical education as it gives students the opportunity to learn more effectively in dialogue with other students (Morris & Blaney, 2010; Siebert, Mills, & Tuff, 2009), which is well in line with the goals of interprofessional clinical education.

A prerequisite for understanding and engagement in team-directed learning is self-awareness, as well as collective responsibilities for the team's assignments (Jacobsen & Lindeqvist, 2009; Mellor, Cottrell, & Moran, 2013).

The importance of students reflecting on their personal and their peers' learning experiences during work-based learning and other clinical activities has been emphasized previously (Boud & Walker, 1998; Sandars, 2009). Reflection is known to encourage students to learn from their own performance and when they reflect together with their tutors, it can also help the tutors to assess whether, how and when a student needs support to reach the goals of a specific course. Reflection requires motivation, training and time for developing self-awareness and new perspectives (Branch & Paranjape, 2002; Kolb, 1984; Moon, 2004; Schön, 1983). Bennett, McCarthy, O'Flynn, and Kelly (2013) have described how prior awareness, understanding and knowledge influence students' perceptions of professional roles, levels of engagement and how they apply prior knowledge and reflect on their learning activities.

In clinical interprofessional education, reflection is an important tool and is used to help healthcare students to better understand how teams work and how they can apply their specific theoretical knowledge within their interprofessional team (Hammick & Anderson, 2009). One such example is an interprofessional training ward (IPTW), which has the general aim of developing the students' professional roles and enhancing their understanding of other professions, as well as the importance of good communication for teamwork and patient care (Gilbert, 2013; Ponzer et al., 2004; Reeves et al., 2010). Furthermore, a course on an IPTW gives the students opportunities to solve upcoming problems together and to socialize in the community of clinical practice (Lachmann, Ponzer, Johansson, Karlgren, &

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Fossum, 2013b; Lidskog, Löfmark, & Ahlström, 2009). IPTW placements have also been shown to provide valuable and enjoyable learning opportunities (Jacobsen, Larsen, & Bæk Hansen, 2010).

We have previously studied students' learning experiences on an IPTW using the contextual activity sampling system (CASS) methodology (Lachmann, Ponzer, Johansson, & Karlgren, 2012; Lachmann, Ponzer, Johansson, Benson, & Karlgren, 2013a; Lachmann et al., 2013b). CASS was designed for collecting data on ongoing learning experiences through frequent sampling using mobile phones (Muukkonen et al., 2007, 2009). The CASS methodology and application, inspired by the experience sampling method (Csikszentmihalyi & Larson, 1987), were developed to investigate university students' activities and their experiences of learning, collaboration and emotions (Muukkonen, Hakkarainen, Inkinen, Lonka, & Salmela-Aro, 2008). We have translated and cross-culturally adapted the CASS methodology for use in clinical interprofessional education contexts (Lachmann et al., 2012). By using the CASS methodology, students' collaborative knowledge-creation (Paavola & Hakkarainen, 2005), academic emotions (e.g. stress) and learning activities can be investigated contextually by frequently letting them respond to questions *via* mobile phones. Our previously published results have shown that CASS provides detailed qualitative and quantitative data that could not have been collected using more traditional methods (Lachmann et al., 2012, 2013a,b). Moreover, the participating students reported that CASS helped them to structure their days and to reflect on their learning activities. Thus, even if CASS is primarily a tool for collecting data on ongoing activities, it is possible that it might also affect students' learning activities by encouraging them to reflect on their experiences.

The aim of this study was to investigate whether the use of the CASS methodology affected students' experiences of their learning activities, readiness for interprofessional learning, academic emotions and of interprofessional team collaboration on an IPTW. Students using CASS (intervention group) were therefore compared with students who did not use CASS (control group) on the IPTW.

Methods

Study context

This study was part of a larger research project focusing on collecting data on students' experiences of clinical interprofessional education by using the CASS methodology. The respondents were undergraduate medical, nursing, occupational therapy and physiotherapy students who took part in a two-week

course on an IPTW at a Swedish teaching hospital during 2009 (Lachmann et al., 2012). On this IPTW, the students are regularly allocated to three interprofessional teams. Each team works together during two weeks and shares responsibilities for patient care under supervision. They work on the ward during an evening shift, followed by a morning shift and then have a day off. At the end of each morning shift, a team reflection session, led by one of the supervisors, takes place with the aim of ensuring time for feedback and discussing the teamwork.

Inclusion criteria

For the purpose of this study, two teams of three from each course were randomly assigned to be included in an intervention group (using CASS) and one team in a control group (not using CASS). To be included in this study, three inclusion criteria were to be met. First, it was required that the students had answered the Readiness for Interprofessional Learning Scale (RIPLS) questionnaire both before and after the course (Ruebling et al., 2014). Second, if the students belonged to the intervention group, the inclusion criteria also required that they had responded to more than five CASS questionnaires. Third, their post-course interview should include data relevant to the purpose of the study. This selection procedure resulted in the inclusion of 20 students from the intervention group and 13 from the control group, thus data from 33 students were included in this study (Table I). As shown in Table I, most of the students were females. In total, 11 medical students, 13 nursing students, 5 occupational therapy students and 4 physiotherapy students were included. The students were aged 22–40 years.

Data collection

Data collection was prospective and purposive to identify previously unknown aspects of the issue. In order to enhance a synergistic understanding of the research question, a mixed methods approach was used. Different types of datasets, both quantitative (questionnaires) and qualitative (interviews), were collected. The mixed methods approach was chosen with the aim of combining the strengths of different types of data collection methods to achieve complementarity (Bryman, 2006; Greene, Caracelli, & Graham, 1989; Johnson & Onwuegbuzie, 2004).

CASS questionnaires

The participants in the intervention group were provided with mobile phones and given short instructions on how to respond to the CASS questionnaires using mobile phones (Lachmann et al., 2012). The CASS questionnaires were distributed *via* the phones five times each study day (one

Table I. Participating students by inclusion criteria.

	Conducted interviews, <i>n</i> = 74	Interviews judged as informative, <i>n</i> = 34	Included
			Completed RIPLS ^a , <i>n</i> = 33 (whereof females)
Intervention group			
Medical students (<i>n</i> = 19)	16	7	7 (3)
Nursing students (<i>n</i> = 21)	21	11	10 (8)
OT students (<i>n</i> = 6)	6	1	1 (6)
PT students (<i>n</i> = 5)	4	2	2 (1)
Control group			
Medical students (<i>n</i> = 7)	7	4	4 (4)
Nursing students (<i>n</i> = 12)	12	3	3 (3)
OT students (<i>n</i> = 4)	4	4	4 (4)
PT students (<i>n</i> = 4)	4	2	2 (2)

^aReadiness for Interprofessional Learning Scale.

OT = occupational therapy and PT = physiotherapy.

before, three during and one after a study day). Each questionnaire consisted of 19 questions: six about *why* the student was performing the ongoing IPTW activity (e.g. interest and part of the job), four about emotions concerning IPTW activities (e.g. enthusiasm and stress) and nine about how they experienced their own and others students' contribution during different activities. Each question was answered using a seven-point Likert scale (1 = strongly disagree and 7 = strongly agree). The students were also given the option to write free text comments.

The students in the control group were not specifically asked about their experiences during the course but responded to a paper-based questionnaire on their last study day. This questionnaire included similar questions to the ones included in the CASS questionnaires.

Readiness for Interprofessional Learning Scale

The RIPLS (Parsell & Bligh, 1999) focuses on students' readiness for and attitudes toward IPE and has been validated for a Swedish context (Lauffs et al., 2008). It consists of 19 questions categorized into the four subscales, Teamwork and Collaboration, Negative Professional Identity, Positive Professional Identity and Roles and Responsibilities, as described by McFadyen et al. (2005) and McFadyen, Webster, and Maclaren (2006). The questions are scored on a five-point Likert scale (1 = strongly disagree and 5 = strongly agree). Higher scores on each subscale suggest more positive attitudes toward interprofessional education. All students were asked to complete the RIPLS both before and after the course (Ruebling et al., 2014).

Semi-structured interviews

Semi-structured interviews were conducted with the students on their last day on the IPTW. The purpose of these interviews was twofold. First, we wanted to obtain additional data for the study purposes and, second, to obtain general information for course development. The focus of the interviews was on interprofessional team collaboration and learning. Three (from the intervention group) of the 77 available students stated that they lacked time to be interviewed. The interviews ($n=74$) were conducted individually (by H. L.) and tape-recorded. The interviews lasted on an average 26 minutes in the intervention group and 18 minutes in the control group.

The following interview questions were chosen to be analyzed for the purpose of this study: What did you learn specifically about interprofessional collaboration on the IPTW? How has the team's planning of the daily work worked out? Did the team evaluate the teamwork? If yes, in what way? Do you think the CASS methodology might contribute to the learning outcomes during clinical courses?

All interviews were listened to several times and transcribed as drafts (by H. L.). Two of the authors (B. F. and S. P.) read all transcribed interview drafts individually with the purpose of obtaining a naïve understanding and thereafter chose the interviews that related to the aim and included rich information regarding the questions in focus (Krippendorff, 2004; Reis & Judd, 2000). The inter-rater agreement between the two readers was 96% and resulted in 34 interviews being selected for further analysis. However, since one of these 34 students had not completed the RIPLS questionnaire, the final number of students included was 33 (see Table I).

Data analysis

Content analysis

The collected interview data were analyzed qualitatively according to inductive conventional content analysis (Hsieh & Shannon,

2005), which is regarded as a suitable method when handling large amounts of qualitative data (Neuendorf, 2002; Patton, 2002; Krippendorff, 2004). The transcribed interviews were condensed into meaning units and then labeled as categories. Categories were identified concerning the study's aims by using the software Open Code 3.6 (Umeå, Sweden), a tool for assisting in coding qualitative data (Dahlgren, Emmelin, & Winkvist, 2007). The process of analyzing the text was discussed in the research group until a consensus was reached.

Statistical analysis

The results are presented as means and standard deviations. A Mann–Whitney test was used to explore differences between the intervention group's responses to the CASS questionnaires (using mean values of all completed questions) and the responses of the control group (paper-based questionnaire on last course day). A paired *t*-test was used when comparing each of the four RIPLS subscales (McFadyen et al., 2005). For RIPLS, the internal consistency was presented for each of the four subscales with Cronbach's alpha (Cronbach, 1951), $\alpha \geq 0.7 =$ acceptable (DeVellis, 2012). Concerning the data collected *via* RIPLS, we also wanted to determine if there was any variation between before, as compared to after, the IPTW course. For this purpose, a paired *t*-test was used. To assess whether there were any significant differences between the students in the intervention group and the control group regarding how they scored, a *p* value of <0.05 was regarded as statistically significant. A spreadsheet application (Excel) and software for statistical analysis (SPSS, version 20; SPSS Inc., Chicago, IL) were used for the data analysis.

Ethical considerations

The Regional Ethical Review Board, Karolinska Institutet, Stockholm, Sweden, approved this study (Dnr: 2011/1720-32). The students were informed individually about participation, which was voluntary, and that it would not have any impact on their grades and would only be used for research purposes.

Results

CASS questionnaires

The control group rated their feelings of stress and challenge significantly higher than the intervention group did, but no significant difference between the groups could be noted regarding the feeling of competence (see Table II).

RIPLS

There were no significant differences between the intervention and control groups regarding the RIPLS ratings before or after the course. Both groups had significantly higher ($p < 0.05$) scores on the *professional identity* subscales compared with their own ratings before the course. The intervention group had significantly higher scores after the course, compared to before the course, on the subscale *teamwork and collaboration* (Table III). The internal consistency of the RIPLS, measured by calculating

Table II. Participants' ratings of CASS questions: number (*n*), means and standard deviations (SD).

CASS question	Intervention group			Control group			<i>p</i> Value
	<i>n</i>	Mean	SD	<i>n</i>	Mean	SD	
Feeling of challenge	20	4.43	0.77	10	5.75	1.39	0.01
Feeling of competence	20	4.99	0.39	10	5.60	1.43	0.18
Feeling of stress	20	2.55	1.02	8	4.40	2.27	0.03

Table III. Comparison of the means and SD's of the RIPLS subscales for each group, before and after the conducted IPTW course.

RIPLS subscale	Intervention group					Control group				
	Before		After		<i>p</i>	Before		After		<i>p</i>
	Mean	SD	Mean	SD		Mean	SD	Mean	SD	
Teamwork and collaboration	38.95	4.88	41.70	3.60	0.02	41.17	4.53	40.85	5.16	0.67
Negative professional identity (reversed)	13.05	1.93	17.35	2.39	0.00	14.00	1.48	16.62	4.29	0.03
Positive professional identity	13.45	1.50	16.10	2.67	0.00	13.08	2.46	16.75	3.05	0.00
Roles and responsibilities	6.25	2.31	5.95	1.99	0.32	5.09	1.22	5.33	2.27	0.70

Table IV. Cronbach's alpha coefficient (α) of the RIPLS total score and subscales (1–19) before and after the conducted IPTW course.

	(α) Before	(α) After	Items
Total score	0.80	0.82	1–19
Teamwork and collaboration	0.82	0.84	1–9
Negative professional identity	0.77	0.70	10–12
Positive professional identity	0.70	0.84	13–16
Roles and responsibilities	0.23	0.23	17–19

the Cronbach's alpha coefficient (α) for the 19 RIPLS items and for the four subscales, was found to be acceptable for three of the four subscales (Table IV).

Interview data

During the interviews, all students described the two-week IPTW course as being valuable in the same way regardless of whether they had used CASS or not. They had noted the importance of good interprofessional teamwork for patient care and had also valued the opportunity to share experiences with students from different educational programs.

As summarized in Table V, the overarching theme "Continuous reflection highlights knowledge, the importance of interprofessional teamwork and academic emotions" emerged from five categories based on condensed meaning units from the interviews. The categories are described with quotes concerning the questions used during the semi-structured interviews.

"Benefits of collaboration" formed one category that was related mainly to the question "what did you learn especially about interprofessional collaboration during the course?" The students answered in the following way:

...when you cooperate...you can avoid misunderstandings... (Intervention group [I], Nursing student [N], female, age 22 years)

...a well-functioning team results in better patient care... (Control group [C], Occupational therapist [OT], female, age 24 years)

"Profession-specific knowledge" was a category describing the students' feelings when they did not know what was important or not while planning the day's work. The interview question "how has the team's planning of the daily work worked out?" related mainly to this category. Students in the intervention group reported that different responsibilities and duties were clarified during the course while discussing and sharing profession-specific knowledge within the team. The control group reported that it was valuable for the team to listen, show respect and devote time to each other and to their specific tasks. The students noted:

... when several professional categories give their professional input... you note so many different things... (I, N, female, age 22 years).

... we talked about what plans everybody had, and that's the way it works... (C, Medical student [M], female, age 34 years).

The category "Reflection" describes the students' experiences and understanding of the team-oriented reflection organized on the IPTW. Students from both groups described their experience almost the same way, i.e. as a moment for retreat. The question, "did the team evaluate the teamwork and if yes, in what way?" was answered by the students in the following ways:

... people didn't have that much to say... (I, N, female, age 27 years)

... it was nice to have a moment to sit down and come together as a group... (C, Physiotherapist [PT], female, age 23 years)

"Enhancing teamwork" described the students' perceptions concerning whether they thought using CASS would improve interprofessional teamwork or not. The students responded in the following way:

...I thought a lot more about what I had been doing... it contributed to the team's work... and to the learning process within the student group... (I, N, female, age 33 years).

...I think I would report my feelings during that particular moment... maybe more directly about how I felt at that time... you forget and your feelings diminish or you skew your memory with the passage of time... (C, N, female, age 40 years).

"Academic emotions" as a category described how answering the CASS questionnaires several times a day provided opportunities for reflection on, e.g. academic emotions such as stress, and how to handle/be prepared for different situations. Students in the control group did not have this experience:

...the questions about stress were useful... I have really had the opportunity to feel how I felt... you breathe in a shallow way and you feel tense... an undefined feeling, to try to quantify it... and it was not that bad... (I, M, male, age 30 years).

...we don't have that many patients, but it still becomes stressful... (C, N, female, age 29 years).

...CASS made us come closer to each other, we got something in common... (I, N, female, age 33 years).

Table V. An overview of the qualitative data analysis of the interviews.

Condensed meaning units (examples)	Category	Theme
... a well-functioning team results in better patient care ...	Benefits of collaboration	Continuous reflection highlights knowledge, importance of interprofessional teamwork and academic emotions.
... several professional categories give their professional input ... you note so many different things ...	Profession-specific knowledge	
... it was nice to have a moment to sit down and come together ...	Reflection	
... I thought a lot more about what I had been doing ... it contributed to the team's work ... and to the learning process within the student group ...	Enhancing teamwork	
... the questions about stress were useful ... I have really had the opportunity to feel how I felt ...	Academic emotion	

In addition, the interviews contributed information from both groups about their experiences and thoughts concerning the use of CASS. During the interviews, all students were asked the question about the CASS methodology, as all of them had been on the IPTW during the study and had heard about and seen CASS being used by other students. The control group not using CASS thought that there might be a benefit in using CASS the way their fellow students had described it. The intervention group said that answering the questionnaires had made them note why and how the different tasks on the ward were important for their learning. They experienced responding to the CASS questions as beneficial; they reflected on their own professional competence and how they could contribute their own knowledge to the whole team. The possibility of reporting several times a day *via* CASS was also experienced as being an opportunity for self-reflection about their academic emotions and seemed to help them to open up their minds and become aware of the different perspectives of teamwork. Furthermore, the intervention group also suggested that an assigned time for discussions within the team concerning questions asked *via* CASS would have been useful for better understanding of others ways of thinking and behaving.

Discussion

The main findings of this study revealed that frequently and continuously answering CASS questions promoted students' reflection on their clinical learning activities and improved their understanding of interprofessional teamwork. This finding is well in line with the finding reported by Bluteau and Jacksson (2009) stating that reflection is needed for effective interprofessional education and that those students who are able to reflect open up their minds to learn from, with and about each other and thus improve their practice.

During the last day on the IPTW, the students in the control group were asked to fill out a retrospective questionnaire similar to the one that the students in the intervention group had filled out continuously *via* CASS during the course. When the groups were compared, the results showed that students in the control group reported having more stress than those in the intervention group. Even if the mean value of the plentiful data collected from a two-week course is not easy to compare with a single, retrospective rating at the end of the course, we still think that this is a very interesting finding. A possible explanation could be that CASS had helped the students in the intervention group to handle stress and other emotionally challenging situations better by discussing and solving problems with the support of their team.

The IPTW seemed to foster the students' professional development in terms of being a member of a team. Both the intervention group and the control group scored the RIPLS

subscale "professional identity" significantly higher after, compared to before, the course on the IPTW, a finding also supported by our interview data. An increase in the clarity of one's own professional identity is probably related to the impact of the IPTW placement itself, as also previously reported by Jacobsen, Bæk Hansen, and Eika (2011). We compared the students' RIPLS ratings before and after the course and showed that the students who had used CASS rated their readiness for teamwork and collaboration *via* RIPLS significantly higher after the IPTW course than before it, a difference that was not noted in the control group. This was an interesting aspect indicating that self-reflection *via* CASS might impact on students' attitudes to interprofessional learning. The RIPLS was originally a pre-intervention tool, but it has also been used for "before and after" comparisons in some studies (Hylén, 2010; Ruebling et al., 2014), but more research is needed in this field. Moreover, Cronbach's alpha for all the other RIPLS subscales except for "Roles and responsibilities" was high. The low value for this subscale confirms previous findings (King et al., 2012; Lauffs et al., 2008; McFadyen et al., 2005) showing that this subscale needs to be reconsidered.

The duration of the interviews varied, probably because students in the control group had less to say about CASS. However, during the interviews, all students described benefits of the course for their understanding of interprofessional collaboration even if some differences between the groups were noted. The students in the intervention group described how collaboration helped them to avoid misunderstandings and how all professions contributed their specific knowledge to the team. They pointed out their acquired understanding of the other professions, while the control group mainly emphasized the benefits of knowing about what other team members were planning to do. Furthermore, the intervention group described how they started to think about how they felt, i.e. how their academic emotions impacted on their own progress during the course while the control group could not pinpoint the reasons for their feelings of stress. These differences could imply that the intervention group did indeed get a deeper understanding of how teams work and of their own role in the team. It is possible that this type of experience might help in developing coping strategies that can be useful in similar situations in the future.

Even though protected time for team reflection was provided for all student groups at the end of their day shift, the individual reflection *via* CASS seemed to fulfill another need. Thus, all students regarded the daily reflections during the protected time more as moments for retreat than opportunities to discuss how their team activities had worked out. According to Sandars (2009), reflection generates a deeper understanding, and it is possible that reflection *via* CASS might have contributed to the

students' understanding of how teams work. The students' description of how they used CASS as an instrument for thinking about why and how they performed different tasks and handled their emotions sheds light on its usefulness.

The strength of the CASS approach is the possibility of collecting a large amount of individual data over time, which provides students with opportunities to learn from their own performance. Another strength of this study was the design that made it possible to compare groups of students using CASS with those not using CASS. However, the study contained a number of limitations. For example, that there were only female participants in the control group. This was unavoidable due to the study design and the fact that most of the students were females. Another limitation was that the students might have only reflected on the issues highlighted in the questions even though it was possible to write free text comments, which were rather few. Moreover, it should be noted that increased self-reflectiveness during this course might not have a lasting effect on the students' behavior and also that answering CASS questions can become a routine procedure if used over a long period of time.

In summary, the CASS methodology appears to stimulate self-reflection and, by so doing, also impacts on students' academic emotions and team collaboration during interprofessional clinical practice.

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Declaration of interest

The authors report no conflicts of interest. The authors were responsible for the writing and content of this article.

References

- Barr, H., Koppel, I., Reeves, S., Hammick, M., & Freeth D. (2005). *Effective interprofessional education: Argument, assumption and evidence*. Oxford: Blackwell.
- Bennett, D., McCarthy, M., O'Flynn, S., & Kelly, M. (2013). In the eye of the beholder: Student perspectives on professional roles in practice. *Medical Education, 47*, 397–407.
- Bluteau, P., & Jacksson, A. (Eds.). (2009). *Interprofessional education: Making it happen*. London: Palgrave Macmillan.
- Boud, D., & Walker, D. (1998). Promoting reflection in professional courses: The challenge of context. *Studies in Higher Education, 23*, 191–206.
- Branch Jr., W.T., & Paranjape, A. (2002). Feedback and reflection: Teaching methods for clinical settings. *Academic Medicine, 77*, 1185–1188.
- Bryman, A. (2006). Integrating quantitative and qualitative research: How is it done? *Qualitative Research, 6*, 97–113.
- Cronbach, L.J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika, 16*, 297–334.
- Csikszentmihalyi, M., Larson, R. (1987). Validity and reliability of the Experience-Sampling Method. *The Journal of Nervous and Mental Disease, 175*, 526–536.
- Dahlgren, L., Emmelin, M., & Winkvist, A. (2007). *Qualitative methodology for international public health*. Umeå: Epidemiology and Public Health Sciences, Umeå University.
- DeVellis, R.F. (2012). *Scale development: Theory and applications* (3rd ed.). Newbury Park, CA: Sage Publications.
- Gilbert, J.H. (2013). Interprofessional – Education, learning, practice and care. *Journal of Interprofessional Care, 27*, 283–285.
- Greene, J.C., Caracelli, V.J., & Graham, W.F. (1989). Toward a conceptual framework for mixed-method evaluation designs. *Educational Evaluation and Policy Analysis, 11*, 255–274.
- Hammick, M., & Anderson, E. (2009). Sustaining interprofessional education in professional award programmes. In P. Bluteau & A. Jackson (Eds.), *Interprofessional education: Making it happen* (pp. 202–226). Hampshire: Palgrave Macmillan.
- Hsieh H.-F., & Shannon, S.E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research, 15*, 1277–1288.
- Hyllin, U. (2010). *Interprofessional education: Aspects on learning together on an interprofessional training ward* (Doctoral Thesis, Karolinska Institutet, Department of Clinical Science and Education, Södersjukhuset). Retrieved from <http://www.hdl.handle.net/10616/38978>
- Jacobsen, F., Bæk Hansen, T., & Eika, B. (2011). Knowing more about the other professions clarified my own profession. *Journal of Interprofessional Care, 25*, 441–446.
- Jacobsen, F., Larsen, K., & Bæk Hansen, T. (2010). This is the closest I have come to being compared to a doctor: Views of medical students on clinical clerkship in an Interprofessional Training Unit. *Medical Teacher, 32*, e399–e406.
- Jacobsen, F., & Lindeqvist, S. (2009). A two-week stay in an Interprofessional Training Unit changes students' attitudes to health professionals. *Journal of Interprofessional Care, 23*, 242–250.
- Johnson, R.B., & Onwuegbuzie, A.J. (2004). Mixed methods research: A research paradigm whose time has come. *Educational Researcher, 33*, 14–26.
- King, S., Greidanus, E., Major, R., Loverso, T., Knowles, A., Carbonaro, M., & Bahry, L. (2012). A cross-institutional examination of readiness for interprofessional learning. *Journal of Interprofessional Care, 25*, 441–446.
- Kolb, D.A. (1984). *Experiential learning: Experiences as the source of learning and development*. Englewood Cliffs, NJ: Prentice Hall. Retrieved from <http://academic.regis.edu/ed205/kolb.pdf>.
- Krippendorff, K. (2004). *Content analysis. An introduction to its methodology*. London: Sage Publications.
- Lachmann, H., Ponzer, S., Johansson, U.-B., & Karlgren, K. (2012). Introducing and adapting a novel method for investigating learning experiences in clinical learning environments. *Informatics for Health and Social Care, 37*, 125–140.
- Lachmann, H., Ponzer, S., Johansson, U.-B., Benson, L., & Karlgren, K. (2013a). Capturing students' learning experiences and academic emotions at an interprofessional training ward. *Journal of Interprofessional Care, 27*, 137–145.
- Lachmann, H., Ponzer, S., Johansson, U.-B., Karlgren, K., & Fossum, B. (2013b). Students' experiences of collaboration during and after an interprofessional training ward course – A mixed methods study. *International Journal of Medical Education, 4*, 170–179.
- Lauffs, M., Ponzer, S., Saboonchi, F., Lonka, K., Hyllin, U., & Mattiasson, A.C. (2008). Cross-cultural adaption of the Swedish version of Readiness for Interprofessional Learning Scale (RIPLS). *Medical Education, 42*, 405–411.
- Lidskog, M., Löfmark, A., & Ahlström, G. (2009). Learning through participating on an interprofessional training ward. *Journal of Interprofessional Care, 23*, 486–497.
- McFadyen, A.K., Webster, V., & Maclaren, W.M. (2006). The test retest of a revised version of the Readiness for Interprofessional Learning Scale (RIPLS). *Journal of Interprofessional Care, 20*, 633–639.
- McFadyen, A.K., Webster, V., Strachan, K., Figgins, E., Brown, H., & Mckechnie, J. (2005). The Readiness for Interprofessional Learning Scale: A possible more stable sub-scale model for the original version of RIPLS. *Journal of Interprofessional Care, 19*, 595–603.
- Mellor, R., Cottrell, N., & Moran, M. (2013). "Just working in a team was a great experience..." – Student perspectives on the learning experiences of an interprofessional education program. *Journal of Interprofessional Care, 27*, 292–297.
- Moon, J.A. (2004). *A handbook of reflective and experiential learning: Theory and practice*. London: Routledge.
- Morris, C., & Blaney, D. (2010). Work-based learning. In T. Swanwick (Ed.), *Understanding medical education, evidence, theory and practice* (pp. 69–82). London: Wiley-Blackwell.
- Muukkonen, H., Hakkarainen, K., Inkinen, M., Lonka, K., & Salmela-Aro, K. (2008). *CASS-methods and tools for investigating higher education knowledge practices*. Papers presented at ICLS'08 Proceedings of the 8th international conference on International conference for the learning sciences, Utrecht, the Netherlands, vol. 2, pp. 107–114.
- Muukkonen, H., Hakkarainen, K., Jalonen, S., Kosonen, K., Heikkilä, A., Lonka, K., Inkinen, M., et al. (2007). *Process- and context-sensitive research on academic knowledge practices: Developing CASS-tools and methods*. In C. Chinn, G. Erkens, & S. Puntambekar (Eds.),

- Proceedings of the Seventh International Computer Supported Collaborative Learning (CSCL) Conference. New Brunswick, NJ: Rutgers University.
- Muukkonen, H., Inkinen, M., Kosonen, K., Hakkarainen, K., Vesikivi, P., Lachmann, H., & Karlgren, K. (2009). *Research on knowledge practices with the Contextual Activity Sampling System*. Rhodes, Greece: Computer Supported Collaboration Learning (CSCL).
- Neuendorf, K.A. (2002). *The content analysis guidebook*. London: Sage Publications.
- Paavola, S., & Hakkarainen, K. (2005). The knowledge creation metaphor: An emergent epistemological approach to learning. *Science & Education, 14*, 537–557.
- Parsell, G., & Bligh, J. (1999). The development of a questionnaire to assess the readiness of health care students for interprofessional learning (RIPLS). *Medical Education, 33*, 95–100.
- Patton, M.Q. (2002). *Qualitative research & evaluation methods* (3rd ed.). London: Sage Publications.
- Ponzer, S., Hylin, U., Kusoffsky, A., Lauffs, M., Lonka, K., Mattiasson, A.C., & Nordstrom, G. (2004). Interprofessional training in the context of clinical practice: Goals and students' perceptions on clinical education wards. *Medical Education, 38*, 727–736.
- Reeves, S., Perrier, L., Goldman, J., Freeth, D., & Zwarenstein, M. (2013). Interprofessional education: Effects on practice and healthcare outcomes (update). *Cochrane Database of Systematic Reviews, 3*, CD002213.
- Reeves, S., Zwarenstein, M., Goldman, J., Barr, H., Freeth, D., Koppel, I., & Hammick, M. (2010). The effectiveness of interprofessional education: Key findings from a new systematic review. *Journal of Interprofessional Care, 24*, 230–241.
- Reis, H.T., & Judd, C.M. (2000). *Handbook of Research Methods in Social and Personality Psychology*. New York: Cambridge University Press.
- Ruebling, I., Pole, D., Breitbach, A.P., Frager, A., Kettenbach, G., Westhus, N., Kienstra, K., & Carlson, J. (2014). A comparison of student attitudes and perceptions before and after an introductory interprofessional education experience. *Journal of Interprofessional Care, 28*, 23–27.
- Sanders, J. (2009). The use of reflection in medical education: AMEE Guide No.44. *Medical Education, 31*, 685–695.
- Schön, D.A. (1983). *The reflective practitioner: How professionals think in action*. New York: Basic Books.
- Siebert, S., Mills, V., & Tuff, C. (2009). Pedagogy of work-based learning: The role of the learning group. *Journal of Workplace Learning, 21*, 443–454.
- Varpio, L., Hall, P., Lingard, L., & Schryer, C.F. (2008). Interprofessional communication and medical error: A reframing of research questions and approaches. *Academic Medicine, 83*, S76–S81.