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Original Article

Developing teamwork skills in pre-registration osteopathy education: A qualitative pilot investigation

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ABSTRACT

Objectives: Teamwork in healthcare provides better outcomes for patients and contributes to job satisfaction and autonomy. Graduate capabilities of teaching institutions require educators to assess teamwork skills. The TeamUP Short-Form (TeamUP-SF) was developed as a self- and peer-assessment tool of teamwork skills following feedback from the previous version. This pilot study evaluated the utility of the TeamUP-SF in developing and assessing teamwork skills in a cohort of senior osteopathy students undertaking group assignments.

Methods: Forty-nine students received the TeamUP-SF after a minimum of 12 weeks of group work. Students rated their own teamwork skills, and those of other members of their group using the TeamUP-SF. Focus groups were conducted to explore students' attitudes and impressions about teamwork and its assessment. Analysis of focus group transcripts followed a constructivist paradigm utilising thematic analysis.

Results: Seventeen students participated in a 1-h focus group about the usability of the TeamUP-SF for assessing and developing teamwork skills. Themes to emerge were perceptions of teamwork, purpose of the TeamUP-SF, usability of the TeamUP-SF, and the emotional impact of evaluating teamwork skills.

Conclusion: The TeamUP-SF may be valuable in developing and assessing teamwork skills. Students recommended using the TeamUP-SF in two ways: assess and monitor their own teamwork skills; and, optimise team function in their own learning environments by focusing on team efficiency and effectiveness. Students also identified limitations of the TeamUP-SF including its use as a summative assessment. These recommendations may reduce the emotional impact on students assessing individuals within a team.

Introduction

Importance of teamwork in healthcare

Improved outcomes for patients, once thought to be solely attributable to the achievements of independent services and practitioners, are now recognised as closely aligned with effective teamwork and collaboration [1,2]. Teamwork in the healthcare context has been described as 'the collective responsibility to care for patients and relying on each other's skills to minimise risk and error' [3] (p. 398). Whereas effective teamwork has demonstrated a variety of benefits in healthcare for both clinicians and patients [4], ineffective teamwork is the top modifiable causes of adverse health outcome and avoidable suffering [5–10] and is a contributor to anxiety and absenteeism in the workplace [5]. For clinicians, effective teamwork has been shown to improve interdisciplinary communication and efficiency [11], decision-making [12], task accomplishment among healthcare professionals [13] and job satisfaction and autonomy [14,15]. For patients, effective teamwork among health practitioners reduces clinical errors and waiting times, improves safety, treatment and quality of care and increases patient participation and empowerment [11,16,17].

Historically, osteopaths have worked in solo private practices in Australia but they are increasingly working in multidisciplinary practices, rehabilitation clinics, aged care facilities, pain management clinics and professional sports clubs [18] where good teamwork skills are essential. Effective teamwork skills are widely recognised as promoting quality patient-care and enhancing employment opportunities [19] and these benefits have been recognised by healthcare learners [20,21].

Challenges in teaching and assessing teamwork skills

Personality factors were previously considered the basis of teamwork with authors linking these to current and future team behaviour

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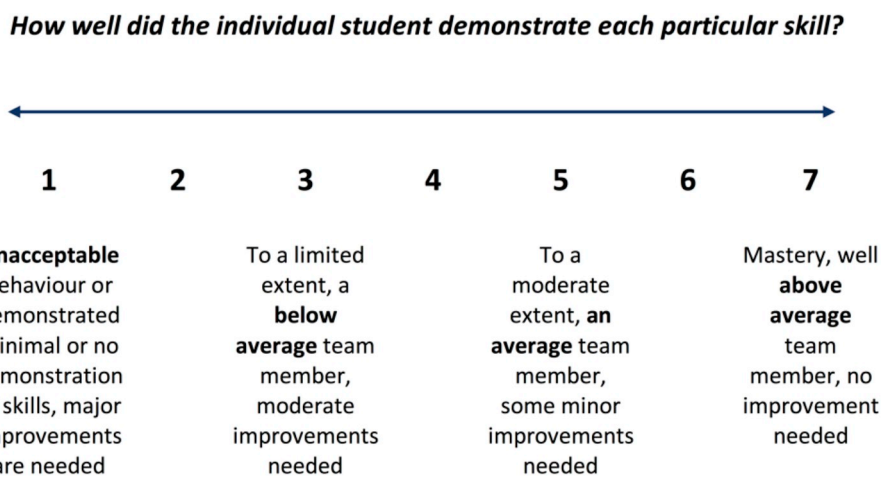

Fig. 1. Likert-type scale used for each of the items on the TeamUP-SF.

[22,23]. Further, effective teams were thought to depend on the cohesion of the personalities within the team [24]. It is now widely understood that teamwork skills are assimilable and teachable, and numerous studies have demonstrated improvements in teamwork skills following training [25,26]. Competence in teamwork skills has become a graduate outcome for healthcare students and health curricula have been revised accordingly [19]. Educators are encouraged to provide students with assessable activities and cultures that can reinforce appropriate teamwork skills [20,27]. While students may not always enjoy the experience of teamwork, they acknowledge that teamwork assists them to develop relevant discipline competencies and prepares them for work as a health professional [28].

Hastie et al. [24] noted the lack of research investigating assessment of individual teamwork skills for students, despite the widespread use of team-based learning [29]. Various approaches to measuring and assessing student teamwork skills have been developed, including questionnaires and open-ended written evaluations [23,30–35]. There are also a number of teamwork assessment rubrics involving both self- and peer-evaluation techniques. However, they have been criticised for lack of standard psychometric properties and rigorous testing [23].

Hastie et al. [36] developed a training package for students to learn pre-specified teamwork skills, which would be self and peer-assessed. These authors developed the TeamUP (Long Form) (TeamUP-LF) specifically for self- and peer-assessment of teamwork skills. A subsequent Delphi study provided validity evidence for the measure [37]. The TeamUP-LF consisted of 45 items comprising the following domains: *Project Planning* (8 items); *Facilitating the Contribution of Others* (11 items); *Fostering a Team Climate* (9 items), *Managing Conflict* (9 items) and *Contributing to the Team Project* (8 items). Initial development of the TeamUP-LF relied heavily on midwifery and education students [36,37]. Attempts to validate the measure in other health professions identified its length as a barrier to its usefulness. Student feedback [38] suggested that the 45-item measure was too time consuming to be used effectively and efficiently in teaching and assessment activities. Valid and reliable short forms requiring less time to administer and score may be better suited to busy educational and practice settings [39]. The aim of this study was to evaluate the acceptability of a short-form version of the TeamUP rubric (TeamUP-SF) as an assessment of teamwork skills with a cohort of osteopathy students at Southern Cross University (SCU).

Materials and methods

This research was approved by the Southern Cross University Human Ethics Research Committee (Approval number: ECN-13-037 & ECN-16-230). The COREQ criteria were used in reporting this qualitative research [40].

The TeamUP rubric was originally developed with midwifery students as a teamwork assessment tool [24]. Its development was informed by the teamwork literature and development over an extended period with feedback from academics and students using the rubic. The rubric was then evaluated through a Delphi methodology with multiple rounds supporting enlarged version of the rubric, demonstrating acceptable content validity based on expert opinion [37]. Additional evidence supporting the construct validity of the TeamUP has also been described [38].

The TeamUP-SF

To develop the TeamUP-SF, data was collected from 177 education students who had used the TeamUP-LF (developed through the Parratt et al., Delphi study) as an assessment tool in their course. Utilising one component of the Confirmatory factor analysis of the education student data was undertaken to confirm the underlying construct and identify the two highest loading items from each TeamUP domain. These items were retained (unpublished data) to create the TeamUP-SF (Supplementary File 1). A 7-point Likert Scale of achievement was adopted, rather than the previous 4-point Likert Scale to ensure more precision in measurement of the items and to allow a 'middle ground' of opinion. The scale for each TeamUP-SF item is presented in Fig. 1 and items for each domain in Table 1.

Participants

Year 4 and 5 osteopathy students who were participating in group research projects as part of the Master of Osteopathic Medicine course at SCU completed the TeamUP-SF as a self- and peer-assessment of other research team members at the end of semester 1 (May 2017) using a paper form. Students were advised that identifiable responses would not be shared with anyone other than the researchers, and that the purpose was to assess the usability of the form and its relevance to their understanding of teamwork. Students in both year levels had completed two lectures on teamwork during the previous semester with a focus on developing teamwork skills. These lectures broadly covered the TeamUP domains, without explicit reference to them. The learning objectives were presented as:

- Identifying strategies for developing team-building and cooperative skills, such as listening and communication skills, leadership, planning, problem solving and sharing of tasks
- Identifying the roles of a group based on true sharing and workload
- Identifying ways to become a good judge of one's own and others'

Table 1
TeamUP-SF items for each domain.

TeamUP Domain	Item
Project Planning Skills "The actions indicating the team member has worked in synergy with others to plan a high quality project."	a) Defining and agreeing on quality standards for each part of the plan b) Participating in role allocations based on individual skills and learning needs
Fostering a Team Climate "The actions fostering a sense of trust and inclusiveness for each team member."	a) Demonstrating self-awareness and emotional regulation b) Cooperating with others to achieve project goals
Facilitating the Contributions of Others "The actions ensuring the process of team interactions are effective in progressing the project plan."	a) Establishing and honouring team ground-rules b) Ensuring that decisions are made in a timely manner
Managing Conflict "The actions preventing, recognising, and/or addressing conflict in ways that strengthen overall team cohesiveness & effectiveness."	a) Minimising unnecessary conflict by project planning and management b) Assisting the team to stay focused on the overall team goal
Contributing to Team Project "The actions demonstrating that the team member has made a high-quality, individual contribution to the team project."	a) Submitting assigned work at the agreed quality standard b) Working to integrate the output of team members into the project

strengths and work ethics
- Professional development through research and intellectual understanding of one's abilities and skills
- Personal growth through increased self-esteem and confidence, and in taking responsibility for own learning
- Further developing reflective practices (reviewing and reflecting, planning for the future)

Evaluation

One week after students had completed the TeamUP-SF they were invited to participate in a focus group of up to 1-h duration. Seventeen students agreed to participate across three focus groups. Two focus groups were facilitated by academics (one of the researchers and an independent academic, both of whom were members of the osteopathy teaching staff) and one by a research assistant (Supplementary File 2 presents the topic guide). Focus groups were audio-recorded with participants' written consent and transcribed verbatim.

Data analysis

Analysis of focus group transcripts followed a constructivist paradigm and utilised thematic analysis. Focus group transcripts were analysed thematically. Data analysis began with each researcher independently scrutinizing focus group transcript to identify initial concepts (descriptive codes) that emerged from the data [41]. The researchers sought to illuminate participants' perceptions of the TeamUP-SF as an authentic representation of teamwork skills and its usefulness for providing meaningful feedback for developing their own and others' teamwork skills. Next, each researcher independently compared codes across the focus groups and clustered them into themes, as described by Miles and Huberman [42]. Subsequently the research team met on two occasions to present their individual analysis to other team members. Discussion of themes continued until they were combined, refined and developed into higher order or meta-themes.

Results

A cohort of 22 fourth year and 27 fifth year osteopathy students completed the TeamUP-SF (Appendix 1). Seventeen students agreed to participate in one of three focus groups (Table 2).

Focus group analysis

Four themes emerged from the focus group data: alignment of the rubric domains with students' perceptions of teamwork, clarifying the purpose of the TeamUP-SF, the usability of the TeamUP-SF, and the potential emotional load associated with using the TeamUP-SF.

Table 2
Overview of focus group participant demographics.

	Male Year 4	Male Year 5	Female Year 4	Female Year 5
Focus Group 1	2	4	2	1
Focus Group 2	2	–	–	3
Focus Group 3	–	3	–	–

Alignment of the rubric domains with students' perceptions of teamwork

After using the TeamUP-SF to reflect on and rate their own teamwork skills and those of other members of their group, students were asked if they felt there were other any aspects of teamwork that were not covered by the rubric. Participants were satisfied that the five key domains of teamwork described in the TeamUP-SF (*Project Planning; Facilitating the Contribution of Others; Fostering a Team Climate; Managing Conflict; and Contributing to the Team Project*) were comprehensive and included all behaviours and attitudes that they considered to be part of teamwork. However, students commented on the complexity of the questions and several participants noted that a number of sub-questions did not appear to directly relate to their domains. The following quotations demonstrate this. For example, students had mentally scored a particular member of their group using the domain descriptor (e.g. 'Contributing to Team Project'), but when they scored that member using the sub-questions the results were different from the one they had first imagined.

> I felt like the questions, the main theme questions – the answers weren't necessarily reflective in the sub-questions. For example, we had [a domain about] contributing to the team project. The [sub-questions] demonstrated that the team member has made a high-quality individual contribution to the project. Now if you ask me that question about one of our team members we would have given them a 2 or 3 and yet when we actually answered both sub-questions they were about 4s, 5s, maybe even 6s. I didn't feel like it really got the essence of what we were trying to say. (Participant 1)

> There were two or three questions that I didn't think matched the domain. [I realised this] because when I read the domain I had already worked out a score before I went to the sub-questions. (Participant 2)

Clarifying the purpose of the TeamUP-SF

All participants supported the usefulness of the TeamUP-SF for self- and peer-assessment of teamwork skills. There was consensus that the tool was useful. Participants described several benefits that the TeamUP-SF could bring to the effective functioning of the team.

> You want to get an idea of what is going on within the group. You get a better idea when you look at what individual people are

contributing and in that way people can reflect on themselves as well. (Participant 12)

For peer-assessments where students ranked the teamwork skills of other members of their team, knowing who would review the results of the TeamUP-SF and assuring the anonymity of respondents were key concerns of students. Knowing who would see their responses was likely to influence the way they responded. For example, students said that they might not be honest if they thought that their comments would be detrimental to their teammates:

It could completely skew your answers. If the supervisors are going to read them we might not be as honest. If [our teammates are going to read them] we might not be as honest because we are friends. (Participant 14)

Students were very concerned that their anonymity be maintained. They recommended an online version of the TeamUP-SF to preserve their privacy. In some groups (e.g. small groups or groups where team members knew each well) students were concerned that they would be able to identify their teammates' feedback because they could recognise each other's handwriting:

If you have only two people in your group, you are going to know who it is by their handwriting. (Participant 8)

Students also had suggestions to expand the range of applications for the TeamUP-SF. These included its use to prompt critical reflection of one's own teamwork skills and to focus on team performance rather than individual performance:

i)Using the TeamUP-SF to develop one's own teamwork skills through self-assessment

Participants suggested using the TeamUP-SF purely as a self-assessment tool to identify their own skills so that they could match tasks to their skill sets. They could use the TeamUP-SF to privately reflect on their own teamwork skills at the beginning of the research project and then monitor their teamwork skill development over the duration of the project. This could be a formative assessment although not necessarily contributing to final grades.

This should be done in stages. When you start, after you've been working together for a while, and then further on so that you have milestones. It would be less harsh if you were aware of things you needed to pick up on. (Participant 15)

ii) Monitoring and improving the effectiveness of the team

Some students argued that the TeamUP-SF should only be used to monitor the team function over time rather than individual contributions to the team:

Individuals make up the team but the outcome of the project is delivered by the team so you need to evaluate the team as a whole rather than what each individual's contributions to that outcome was, because you have people who are not necessarily going to get along and if they don't … that could have a negative impact on the whole project. (Participant 4)

I think that it would be good to have each person speak about how we work as a group rather than putting a number for each person's individual contribution. (Participant 13)

Usability of the TeamUP-SF

Students reported that they spent 10–15 min completing the rubric and that assessing larger groups could take a little longer. Participants reported that the TeamUP-SF was easy to use and that it was time-efficient because of its format.

I liked having a box to tick because you didn't have to think heaps about how to write something down. (Participant 11).

Several modifications were suggested including improving the layout of the TeamUP-SF (Appendix 1).

I understood it and it was really easy. I would have changed the layout where the comments are. (Participant 14)

You've got a massive section at the top and you keep repeating the 1 to 7 but the questions are tiny. Have the questions closer to where you have the 1 to 7 so that you can easily see the question you are being asked and they are closer to the grading system … (Participant 15)

These layout suggestions have been incorporated into TeamUP-SFv2 (Supplementary File 3).

Potential emotional load associated with using the TeamUP-SF

Being asked to rate members of their team and being ranked by them was a source of discomfort and anguish for many students. They were concerned about the impact those responses could have on their and other students' course progression even though as part of the explanation of the research students were assured that ratings provided would not be used to inform formal assessment.

I felt that having to give everyone a number and knowing that my friends in my group are going to see that … putting a number on someone made me feel that maybe I shouldn't be giving them such a low number because if they are going to see this I don't' want them to be upset. I don't want to give them negative feedback. I think I intentionally scored more leniently. (Participant 15)

It's really hard to critique each other. We are already critiqued enough by our teachers and supervisors. (Participant 6)

One participant suggested that the assessment of teamwork skills should be seen in the context of a business contract. The team is simply engaged to complete a project and the emotional content of assessing peers should be set aside.

If you implement a business model it takes all the emotion out of it. It puts the accountability [up front]. Each person's different skills come together to do the project … one is great at writing, another is great at negotiating … so if you could use it like a profile tool … you would have to put out a lot less fires and [deal with fewer] emotions because everyone knows what their role is, what their responsibilities are and what is expected. (Participant 6)

By focusing on the strengths and weaknesses of the team and ways to develop the team, interpersonal working relationships could be fostered.

In this study, the TeamUP-SF was issued in paper form. Some students were concerned that written feedback gave participants time to think about their responses (compared to more spontaneous verbal responses) and that having more time increased the emotional impact of peer-assessment.

I give my group feedback straight from the mouth. I just bring it up straight away. It's pretty hard doing feedback afterwards. (Participant 8)

Doing this feedback afterwards and delivering it like this - there is too much room for emotional build-up. (Participant 7)

You can say, 'I think you forgot to do this.' That is how I would do this and you can convey your emotions, your facial expression. This is just a bunch of words on paper like a text message so many people take it the wrong way. (Participant 6).

Discussion

This pilot study sought to evaluate the usability of the TeamUP-SF as a tool for assessing and developing teamwork skills in osteopathy students at SCU. With osteopaths increasingly working in team care environments, there is a need to ensure that these teamwork skills are developed in the pre-professional curriculum. Effective teamwork skills are widely recognised as promoting quality patient-care and enhancing employment opportunities [19], and these benefits have been recognised by osteopathy students [20,21]. Group assignments are commonly used for the purpose of developing and assessing teamwork skills, but in many cases, it is done without appropriate guidance for teamwork skill development [33,43]. Self and peer-assessment tools like the TeamUP-SF may play a role in helping to build teamwork literacy, and confidence and capability in teamwork assessment. Used in ways that enable students to honestly assess their own and other team members' skills without fear that their privacy will be compromised, the TeamUP-SF can provide feedback for reflection and prompt useful discussions about skills development. It is also prudent to ensure that the students are satisfied that their privacy will be retained when participating in teamwork assessments where they are required to assess their peers.

Participants indicated that the TeamUP domains were congruent with their personal conception of teamwork. The domain content for *Project Planning*; *Facilitating the Contribution of Others*; *Fostering a Team Climate*, *Managing Conflict* and *Contributing to the Team Project* were identified by participants as relevant to assess teamwork in the project context. However, participants were concerned about the allocation of questions to specific domains. Although previous work with the TeamUP-LF has not identified a similar concern, this concern may stem from only two items representing each domain rather than the breadth of items in each domain captured in the TeamUP-LF. A potential solution is to remove the domain descriptors so that the TeamUP-SF would simply consist of 10 questions (2 questions for each of 5 domains) to be ranked using the 7-point Likert scale (see Appendix 2). An additional solution could include a Delphi study with students allowing them to identify and agree on the most relevant items from each of the Domains then retesting the rubric. This may identify more than two items that best capture their conception of the TeamUP domain.

Teamwork in the pre-professional education context will often be associated with the completion of a group project. For both educator and students, a significant challenge is the fair and equitable assessment of team performance. In this study, participants identified three applications of the TeamUP-SF: 1. self-assessment, 2. assessment of individual contributions to the team, and 3. assessment of the function of the team. However, they only positively supported 1 and 3. They advocated for the use of the TeamUP-SF as a self-assessment tool that could be used to prompt private reflection on their own strengths and challenges, and to monitor development of their teamwork skills over time [44].

Participants also supported the use of the TeamUP-SF to assess the extent to which the team was achieving its goals and to act as a catalyst for strategies that promote effective functioning of the team [28]. They advocated this particular use because it shifted the emphasis from individual performance (and the uneasiness they felt about ranking their friends' performance) to team performance as a whole. Using the TeamUP-SF to assess and monitor the functioning of the team may be useful to drive decision making about allocation of tasks to team members. There was considerable concern about the use of the TeamUP-SF to critique others' performance, primarily because of the potential influence such an activity could have on relationships with team members. This is a commonly cited concern of peer-assessment [44]. One participant observed that rubrics like the TeamUP-SF could potentially fragment rather than consolidate the team if the rubric were interpreted as an opportunity to identify team members who were not contributing to effective group function [45]. A focus on assessing team function and collaborative learning [46], rather than individual members of the team, would overcome any apportioning of blame to less able or less committed team members. Assessment of team function may also assist students to further develop their teamwork capacity by identifying those aspects of the team that were performing well, and those aspects that were underperforming, in addition to reducing the emotional load of assessing individuals in the team. Introducing teamwork skill assessment early in the curriculum may also be beneficial in addressing these concerns by socialising students to these skills.

Regardless of its purpose, the emotional impact of participating in self- and peer-assessment can be high [47,48]. This load may vary depending upon the formative or summative nature of the assessment and the extent to which they are called on to make judgements about peers. Some participants found providing feedback about team performance difficult; others felt sufficiently comfortable with the process to be forthright. A possible solution, as suggested by one of the participants, is to shift the focus to the team itself, how it functions as a whole, and how individuals can contribute to enhance its efficiency and produce results. Shifting the focus to the team in this way may require further refinements to the wording of the TeamUP-SF but it could help to reduce the emotional load associated with providing feedback on their peer's performance.

Limitations of the study

There are number of limitations in the current work. First, participants were all from a single institution and the results derived from a single cohort. Different cohorts may provide alternative responses due to different group dynamics. Generalisation across larger cohorts is not possible because of the small size of the participant population. The current work was also undertaken in the context of a coursework research project and the utility of the TeamUP-SF in other non-research subjects, or in earlier years of a curriculum would require exploration. Translation of these findings to the clinical learning environment or other group project work (i.e. presentations) remains to be established and may provide different outcomes.

There are a number of additional research opportunities including the use of the TeamUP across all aspects of a curriculum to ascertain if differences exist based on stage of the curriculum, assessment task etc. There is also an opportunity to explore the use of individual TeamUP domains that are aligned to the requirements of specific assessment tasks.

Conclusion

Students who participated in this pilot study suggested that the TeamUP-SF may be valuable in developing and assessing teamwork skills. The evolving nature of osteopathy care means that practitioners are becoming increasingly likely to be exposed to team-based care and expected to participate in such care. Developing teamwork skills in the pre-registration curricula is important for employability and to ensure graduates are effective team-based care participants. Additional work on the structure of the TeamUP and the items comprising each domain represents an area for future research. Osteopathy educators are encouraged to make the TeamUP-SF available to students to assess and monitor their own teamwork skills, and to optimise team function in their own learning environments through the exploration of ways in which individual students can enhance the function of the team. How these skills translate to team-based care provides an avenue for further research.

Statement of conflicts of interest

Brett Vaughan is an editor at the International Journal of Osteopathic Medicine and did not participate in any editorial review or decision regarding publication of this manuscript.

Ethical Approval

This research was approved by the Southern Cross University Human Ethics Research Committee (Approval number: ECN-13-037 & ECN-16-230).

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ijosm.2019.07.003.

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