# COMPARING INTERVIEW-DRIVEN AND QUESTIONNAIRE-DRIVEN CONCEPT MAPPING PROCESSES: A FOCUS ON THE RESEARCH-TEACHING NEXUS IN HIGHER EDUCATION

*Joana G. Aguiar[1], Ian M. Kinchin[2], Marion Heron[2] & Paulo R. M. Correia[1]*
*[1]Universidade de São Paulo, Brazil*
*[2]University of Surrey, UK*
*Email: {joanaguilares, prmc}@usp.br, {i.kinchin, m.heron}@surrey.ac.uk*

**Abstract**. Concept maps may be elicited within research studies in a variety of ways. Inadequate description of this methodology in the literature may cast doubt on the reliability of conclusions. Interview-based protocols are widely used, and the quality of the talk during the interview needs to be considered. The increasing use of semi-automated procedures using online forms and questionnaires by other researchers also needs to acknowledge the potential impact of this methodology on the quality of the final map, particularly the degree of feedback that is given to the mapper and the support given to edit the map – a stage that is required to support higher level thinking skills. The aim of this paper was to compare two approaches to concept map elicitation (interview and questionnaire) by considering their influence on the portrayal of academics' beliefs about teaching and research activities in academia. The results demonstrated the method of elicitation has an influence on the structure and content of the final map and this needs to be acknowledged in research reports. Moreover, strengths and weaknesses of each concept mapping elicitation processes could provide innovative methodologies for academic development.

**Keywords**: concept mapping, research-teaching nexus, questionnaire, interview, academic development, pedagogic frailty

## 1    Introduction

Within higher education, academics' values and beliefs constitute an implicit discourse that drives their teaching practice and provides a source of personal motivation. This teaching practice is, however, mediated by pragmatism, especially where institutional goals (often driven by calls for efficiency and accountability) appear to conflict with academics' personal professional aspirations.

Concept maps are described as a tool that can be used to organise and visualise mental representations, values and beliefs (e.g. Moon et al., 2011; Kinchin, 2016). This is not quite the same as mapping agreed curriculum knowledge where there is a particular outcome or "expert map" in mind as a goal. There is no right answer here. However, without an overarching organising principle, such maps can appear unstructured and difficult to interpret or compare with others (e.g. McMillan & Gordon, 2017). By including the maps within the overarching framework provided by the model of pedagogic frailty (Kinchin & Winstone, 2017), these maps of values and beliefs can be focussed on particular concepts that potentially cause difficulty for the evolving university teacher. The nature of the research-teaching nexus constitutes one of the four dimensions within the frailty model.

Maps can be produced through an array of approaches and for different purposes, such as, individual elaboration (Novak, 2010), collaboration (Torres & Marriot, 2010), knowledge elicitation and preservation (Hoffman et al., 2006), knowledge management (Correia, 2012), instruction (Aguiar & Correia, 2016) and assessment (Ruiz-Primo & Shavelson, 1996); and can be constructed using paper and pencil or digital/online tools. What is not always considered in the research literature is the impact the map elicitation process may have on the structure and content of the final map. For example, how might an interviewer influence the outcome? How does the nature of the dialogue between interviewer and interviewee influence map construction? Such questions are now being considered in depth (e.g. Heron, Kinchin, & Medland, 2018). Moreover, the increasing use of semi-automated procedures using online forms and questionnaires by researchers also needs to acknowledge the potential impact of this methodology on the quality of the final map – particularly the degree of feedback that is given to the mapper and the support given to edit the map.

### 1.1    Research-teaching Nexus in Higher Education

The relationship between the two central activities of universities (teaching and research) is highly complex. Whilst many universities like to stress the overlap between them by making claims about delivering "research-led" teaching, this is a rather simplistic position that requires further clarification and explanation as this type of teaching seems to mean different things to different people. The nature of the relationship depends on academics' perceptions of what we mean by "research" and by "teaching". Common use of these terms can mask differences in

understanding and this in turn can promote pedagogic frailty, creating unproductive tensions between academics (Kinchin, 2017). Whether we consider research in terms of its products (e.g. papers and reports) or as a process (such as a set of skills or disciplinary ways of thinking) has a profound influence on its relationship with teaching. Whilst students may not be able to understand the nuances of a research paper (product), they should be engaged in disciplinary ways of thinking (processes). Just as research can be interpreted in different ways, so too teaching can be seen as the delivery of content to passive receivers of knowledge, or as engagement with students as active constructors of understanding. From this, we can see that there are already a range of different relationships that could be conceived between teaching and research. On top of these differences, there are disciplinary variations in the way that teaching and research are related and individual staff motivational differences (with some staff hired predominantly to teach and others to conduct research). The distribution of resources between the two activities may create tensions that lead to perceptions of departments as being "research-drained" (where research activities takes energy and resources away from teaching); "teaching-drained" (where there is an imbalance of resources that favour teaching); or "research-separated" (where the two activities are undertaken by two separate populations of academics) – see Hosein (2017) for a thorough discussion.

Therefore, in practice, it is evident that there are different and inconsistent levels of interaction between teaching and research, even within a single academic department. We should, perhaps, consider a whole range of cohabiting, and potentially unstable research-teaching **nexuses** within a complex and changing university environment (see Tight (2016) for a review of the literature). As such, there will be no simple view that can adequately predict or describe the nature of the relationship within any given institution. It is necessary, therefore to seek rich descriptions of the nexus, as it is perceived to impact individual academics' roles. The construction of concept maps is one way to obtain such rich descriptions and may also help to observe qualitative changes in connections within the nexus over time.

This paper aims to compare two approaches to concept map elicitation (interview and questionnaire) in order to consider their influence on the portrayal of academics' beliefs about teaching and research activities in academia.

## 2    Methods

This research utilises qualitative research methods designed to explore the research-teaching nexus in higher education. Academics from a UK and a Brazilian university were invited to participate in this study. The present work describes a case study focusing on the conceptions, ideas, beliefs and values of **one academic** who has major teaching and researching roles within his science faculty. In this section, we describe our interview-driven and questionnaire-driven concept mapping approaches and explain how these would result in different outcomes (i.e., concept maps). The academic was interviewed in July of 2016 and he answered the online questionnaire in November of 2017. An expert-mapper conducted the interview and also elaborated the concept map considering the questionnaire's answers.

### 2.1    The Interview-Driven Concept Mapping Procedure

To start the interview dialogue, a number of prompting concepts were offered as words on 38 x 50 mm sticky-notelets to act as concept labels, and these were stuck to a sheet of A3 paper. These concepts (motivation, recognition, research, rewards, status and teaching) were presented in no particular order and the interviewee was told that he could use as many or as few of these as they wished and could add any concepts they wanted to. A semi-structured interview was adopted, guided by three main questions:
- Within your University, Institute or Department, where is the focus on: research, teaching or both?
- Is there a connection or tension between research and teaching activities?
- How do research and teaching unfold in rewards, recognition, status, and motivation?

The interviewer's role is then to prompt interviewee with questions to encourage he/she to interrogate his/her own knowledge structure as it emerges as conceptual relationships on the page. Once the sheet becomes full, the interviewee tends to stop adding new ideas, providing a helpful self-regulation mechanism on the size of the resulting concept map. This, in turn, helps the interviewee to concentrate on the key ideas they want to present in the available space, leading him/her to review and refine the entire network (Cañas, Reiska & Möllits, 2017). The final

step involves an internal validation process regarding the represented information drawn in the concept map. Whilst Oancea, Florez Petour, & Atkinson (2017, p. 306) did not use concept maps as final visual representations, their approach to gathering the data is based on a set of similar assumptions to our own:

> *"Unlike quantitative network studies, the emphasis here was on the qualitative construction and interpretations of these networks by the participants. The critical filter for inclusion in the map of a particular element of the network was the extent to which the participant judged it as relevant to their own interpretation and articulation of cultural value processes and outcomes."*

## 2.2 The Questionnaire-Driven Concept Mapping Procedure

The questionnaire was designed in six parts (A-F). Each part had the purpose of identifying academic's conceptions about one specific aspect of research-teaching nexus. The purpose, question type and answer format are provided in Table 1. The Qualtrics survey platform was used to host the questionnaire, which it was controlled by password[1]. The academic's answers were downloaded and analysed considering their content. Each part of the questionnaire provided information that was 'translated' into concepts and propositions needed to draw the concept map.

**Table 1.** Questionnaire design: each part (A-F) had a purpose, a question type, an answer format. Some examples are provided.

| [PART] PURPOSE | QUESTION TYPE | ANSWER FORMAT | EXAMPLE |
|---|---|---|---|
| **[A]** Level of importance and priority considering teaching and research activities | 14 scrambled research and teaching activities | **Rank order** Rank in order of importance and priority when no constraints of time are imposed | (a) Disciplinary research activities: manage approved grants; engage on peer review paper. (b) Teaching activities: lecture; grade assignments; prepare a lesson plan. |
| **[B]** Level of agreement considering some general beliefs about research and teaching on higher education | 30 statements to be judged | **Multiple matrix** Jude using a 6-point-scale from 1 = strongly disagree to 6 = strongly agree; plus, the option Not Applicable [N/A] | (a) Research is overvalued by the academia. (b) The university has a systematic way to evaluate a good teacher. |
| **[C]** Personal beliefs when comparing research and teaching rewards, recognition, motivation and status | 6 questions that compare research and teaching | **Multiple choices** Choose between three options: more, less or equal | (a) For me, research generates [more \| less \| equal] motivation than teaching. (b) The students valued a good researcher [more \| less \| equal] than a good teacher. |
| **[D]** Examples of rewards, recognition and status on research and teaching. | 6 questions that ask for examples | **Short text entry** Maximum of 75 characters allowed for each question | (a) In research, what does recognition look like? (b) In teaching, the status can be a consequence of mainly two things: |
| **[E]** Perception of how influential some 'actors' are for rewards, status and recognition within research and teaching. | 2 questions requesting the influence of university, colleagues, the academic community, students, head of department and society | **Slide bars** Move the bars considering 0 (no influence) to 100 (very strong influence) for each actor | Considering only the research activities, how influential is each of the below options in relation to rewards, recognition and status? |
| **[F]** General behaviour to a given scenario considering a tight deadline | 2 questions that put some tension between research and teaching | **Long text entry** Maximum of 1000 characters allowed for each question | Imagine that you have a tight deadline to finish a review of your own paper; come up with an idea for a PhD grant proposal; plan the next lectures and come up with an idea for an assessment task for your students. How do you manage and integrate different activities? |

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[1] To have access to the survey please use the password 'unlock' and the following link:
https://qtrial2017q3az1.az1.qualtrics.com/jfe/form/SV_aeNjmBflQnz29jn [May/2018].

## 3 Results and Discussion

### 3.1 The Outcome of the Interview-Driven Concept Mapping

During the interview, the interviewer uses a range of linguistic devices to prompt reflection and discussion. Specifically, such techniques are a range of probing strategies (Bernard, 2013) with the aim of showing interest and engaging with the interviewee's talk (Hammersley & Atkinson, 2007). The map acts as a physical artefact, which stimulates discussion and encourages personal and perhaps subconscious views or beliefs to be externalized (Kandiko, Hay, & Weller, 2013). Rapley (2004) identifies a number of 'engaged' elicitation strategies, which are:
- Introducing a topic for discussion.
- Listening to answers and asking to follow up questions.
- Listening to interviewees and getting them to unpack terms.
- Listening and following up with personal ideas and experiences.
- Listening and backchanelling (use of um, ah, and other verbal techniques to maintain the discussion).

For example, a section of the interview between the interviewer (IR) and the interviewee (IE) below (Table 2) demonstrates the co-construction of the concept map. At this point in the interview (from 05'21" to 06'14") the participants were discussing how the university affects researching activities to clarify the relationship between the concepts UNIVERSITY (not yet in the map) and RESEARCH (already in the map). The discussion, through probes and questioning techniques, leads to a co-creation of the proposition "My university ― can be classified as a university of → Research" (in bold in Fig. 1).

**Table 2.** A section of the interview dialogue between the interviewer (IR) and the interviewee (IE) from 5'21" to 6'14". They were discussing how the university affects researching activities, which resulted in the co-creation of the proposition "My university ― can be classified as a university of → Research" (in bold, Fig. 1).

1. *IR: Maybe this issue has to appear here [I point down to the map], as a context, that justifies all this. From my view, I understand that in fact this imbalance is imposed by the context where you are.*

2. ***IE: Um…that I chose to be.***

3. *IR: That you chose to be ...*

4. ***IE: Exactly.***

5. *IR: So there's an agreement here…*

6. ***IE: And this is not good or bad.***

7. *IR: There is an agreement that your university is a research university.*

8. ***IE: Yes. Then put here [He points down to the map] "Research University". Because this is a concept that ... there is a categorisation of universities.***

9. *IR: But, are you talking about all kind of universities or only your university?*

10. ***IE: My university, then ...***

11. *IR: So, may I write "my university is a university of research"?*

12. ***IE: can be classified as… it is a good solution.***

In line 1 of the transcript, the IR demonstrates her familiarity with the IE's working context and perhaps also his perspectives on his context "*From my view, I understand that in fact this imbalance is imposed by the context where you are*". According to Garton and Copland's (2010) personal relationships are invoked in the interview talk and can support the co-construction of the interview data. In line 3, the IR uses repetition, to check her understanding of the IE's point from line 2. In line 5, the elicitation technique adopted by the IR is a statement, which seems to function as a question, but in line 6 the IE is still referring to the fact he chose to be in his institution – the point he made in line 2. The IR brings him back to her probe in line 7, which the IE answers in line 8. The IR also asks for clarification by questioning the IE in line 9, which makes him reflect on this new concept. As a response, the IE

orients the discussion to the concept of "My university" in line 10, which makes the IR suggests a new proposition that links the concepts of "My university" and "Research" in line 11 (see proposition in bold in Fig. 1). While the IR is writing the propositions, the IE suggests the term "can be classified" instead of only "is a", which it is immediately incorporated by the IR. This dynamic exchange demonstrates the collaborative nature of the concept mapping interview and how the concept map is co-constructed in and through the interview talk (Talmy, 2011).
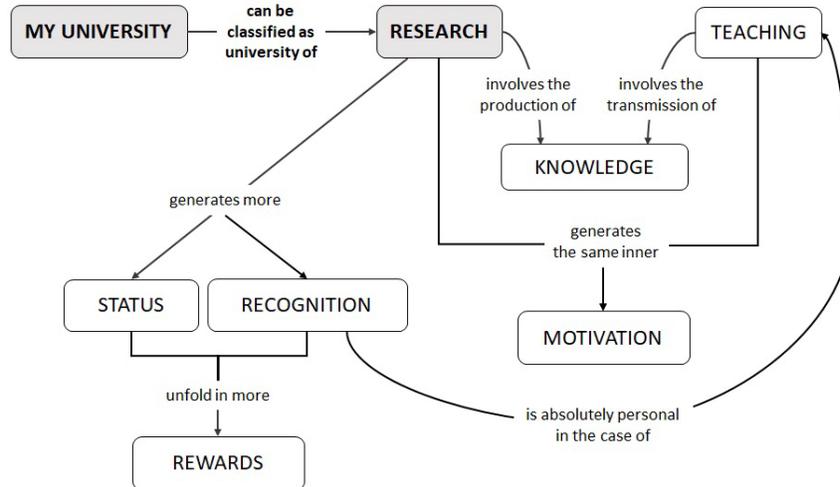


**Figure 1.** The interview-driven concept map (proposition in bold were co-created during the discussion shown in Table 1).

### 3.2    The Outcome of the Questionnaire-Driven Concept Mapping

To illustrate the protocol of "translating" the questionnaire answers into a concept map, we show a partial view of the academic's answers of Parts B, C and D of the questionnaire (Fig. 2) and their correspondence to the concept map (Fig. 3). Good concept maps must fulfil some predefined criteria related to both graphical structure and content accuracy, such as organising concepts in a hierarchical way and constructing correct and relevant propositions (Cañas & Novak, 2006). In this paper, we followed these criteria to ensure the construction of an excellent concept map (Cañas, Novak, & Reiska, 2015; Aguiar & Correia, 2017).

To start drawing the concept map, we chose some key concepts to represent the research-teaching nexus (Kinchin et al., 2016): motivation, recognition, research, rewards, status, students, teaching, university. We organised these concepts in a top-down hierarchy. For example, "university" is the most general concept, therefore, it is at the top of the map. The examples regarding rewards and recognition should be on the bottom of the map as they are very specific and individualised. Following, we connected pairs of concepts through a directional arrow (providing a reading flow) and a linking phrase with a proper verb. In other words, we established concise and clear propositions by using the statements judged as "strongly agree" or "strongly disagree" in Part B of the questionnaire (Fig. 2).

For example, the academic strongly agreed that the university has a systematic way to evaluate a good researcher (1, Fig. 2) and undervalues teaching (3, Fig. 2). Both statements were transformed into propositions 1 and 3 in Fig. 3, respectively. The same pattern can be seen for statements 5, 6 and 7 in the questionnaire (Fig. 2). The academic also strongly disagreed that university has a systematic way to evaluate a good teacher/teaching (4, Fig. 2). In this case, the linking phrase received a negative connotation by including "does not have" (4, Fig. 3).

Some statements judged by the academic as "moderately agree" or "moderately disagree" were also considered for constructing propositions in the concept map. However, the linking phrase was slightly changed in order to match to academic's conceptions. For example, he moderately agreed that university overvalues research (2, Fig. 2). In this case, instead of using the verb "overvalues" we used only "values" in order to decrease the level of agreement. The same pattern can be seen for statement 8 (Fig. 2): as the academic moderately agreed that his teaching practice is informed by research, we adopted the term "somehow" in the linking phrase to construct the proposition (8, Fig. 3).

# PART B

*Please, tick the box corresponding to the one most appropriate answer to each question that best fits your immediate beliefs. Responses are measured on a six-point scale (1 = strongly disagree to 6 = strongly agree). If you do not have a formed opinion about the statement, please, choose N/A (non-applicable).*

| | Strongly disagree | Moderately disagree | Slightly disagree | Slightly agree | Moderately agree | Strongly agree | N/A |
|---|---|---|---|---|---|---|---|
| The university values research and teaching equally | ○ | ◉ | ○ | ○ | ○ | ○ | ○ |
| Teaching leads to rewards | ◉ | ○ | ○ | ○ | ○ | ○ | ○ |
| 2 Research is overvalued by the university | ○ | ◉ | ○ | ○ | ○ | ○ | ○ |
| Motivation is needed for teaching | ○ | ○ | ○ | ○ | ○ | ◉ | ○ |
| 9 Research leads to recognition | ○ | ○ | ○ | ○ | ◉ | ○ | ○ |
| 8 My teaching practice is informed by research | ○ | ○ | ○ | ○ | ◉ | ○ | ○ |
| 4 The university has a systematic way to evaluate a good teacher | ◉ | ○ | ○ | ○ | ○ | ○ | ○ |
| 9 Research leads to high status | ○ | ○ | ○ | ○ | ○ | ◉ | ○ |
| 7 Teaching requires motivation | ○ | ○ | ○ | ○ | ○ | ◉ | ○ |
| 3 Teaching is undervalued by the university | ○ | ○ | ○ | ○ | ○ | ◉ | ○ |
| 9 Teaching leads to high status | ◉ | ○ | ○ | ○ | ○ | ○ | ○ |
| I usually encourage research in my classes | ○ | ◉ | ○ | ○ | ○ | ○ · | ○ |
| Teaching means transmitting new knowledge | ○ | ○ | ◉ | ○ | ○ | ○ | ○ |
| 1 The university has a systematic way to evaluate a good researcher | ○ | ○ | ○ | ○ | ○ | ◉ | ○ |
| 5 Research means producing new knowledge | ○ | ○ | ○ | ○ | ○ | ◉ | ○ |
| Teaching leads to motivation | ○ | ○ | ○ | ◉ | ○ | ○ | ○ |
| Research and teaching are imcompatible activities | ○ | ◉ | ○ | ○ | ○ | ○ | ○ |
| 9 Research leads to rewards | ○ | ○ | ○ | ○ | ◉ | ○ | ○ |
| I spend more time on research than teaching activities | ○ | ○ | ○ | ○ | ○ | ◉ | ○ |
| I succeed in integrating research and teaching | ○ | ○ | ○ | ◉ | ○ | ○ | ○ |
| Research is more appreciated than teaching | ○ | ○ | ○ | ○ | ◉ | ○ | ○ |
| 6 Research helps on my teaching practice | ○ | ○ | ○ | ○ | ○ | ◉ | ○ |
| Teaching and research should be more interconnected | ○ | ○ | ○ | ◉ | ○ | ○ | ○ |

# PART C

Please, choose the word in the list corresponding to the most appropriate answer to each question that best fits your beliefs.

*For me, research generates (_____) rewards than teaching*

○ less
○ equal
◉ more — 9

*For me, research generates (_____) status than teaching*

○ less
◉ more — 9
○ equal

# PART D

Please, write one or two words inside each box corresponding to the most appropriate answer to the question. Do not spend too much time on the task, if you cannot remember anything, just leave it blank.

*If you are a good researcher, the two most important rewards are:*

Recognition and autonomy [10]

*If you are a good teacher, the two most important rewards are:*

Institutional recognition and autonomy [10]

*In research, what recognition looks like?*

Peer recognition [10]

*In teaching, what recognition looks like?*

Institutional recognition [10]

**Figure 2.** Academic's responses to parts B, C and D of the questionnaire. The answers (from 1 to 11) were used to elaborate his individual concept map showed in Fig. 3.
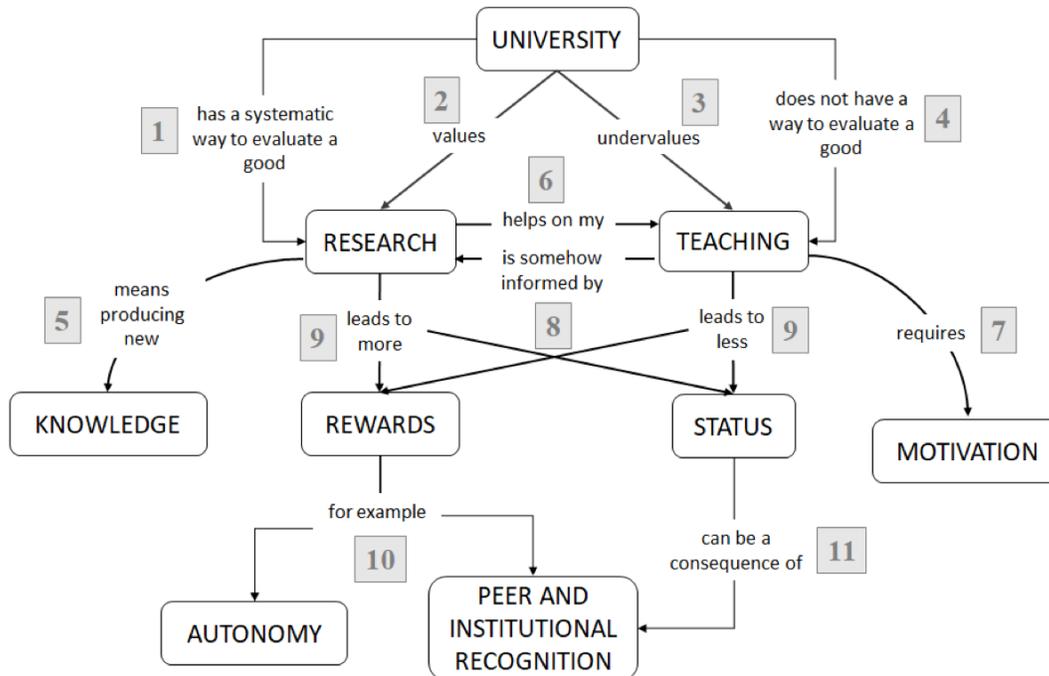
**Figure 3.** The questionnaire-driven concept map (the numbers refers to the academic's answer depicted in Figure 2).

Proposition number 9 were constructed using two sources of information in the questionnaire. The academic strongly/moderately agreed that research leads to high status and rewards (Part B, Fig. 2) which is higher than in teaching (Part C, Fig. 2). At the same time, he also strongly disagreed that teaching leads to high status and rewards (Parte B, Fig. 2). These answers produced four intertwined propositions in which research and teaching lead to more or less rewards and status (see 9, Fig. 3).

Part D of the questionnaire (Fig. 2) provided some examples for progressively detailing how the academic sees the mechanism of rewards, recognition and status within higher education. For him, research unfolds in rewards (such as, recognition and autonomy), whilst in teaching rewards are also autonomy but institutional recognition. Moreover, recognition in research looks like "peer recognition". Then, we decide to separate two concepts "Autonomy" and "Peer and institutional recognition", sharing the same linking phrase to create the proposition 10 in the map (Fig. 3). Lastly, one of the main consequences of a high status is the recognition from other academics (peer recognition) and from the university (institutional recognition). Then, we used the concept of "Status" to create proposition number 11 in the concept map (Fig. 3).

It is important to note that slight agreements or disagreements in Part B of the questionnaire were disregarded when constructed the concept map. First, because we aimed to produce a map with the academic's strongest views highlighting the key points of his conceptions and beliefs. Second, the use of 'might', 'can be', 'perhaps', 'sometimes' decrease the level of content accuracy and the map's explanatory feature. Lastly, adding too many propositions would hamper the map's visual layout, readability and overall quality (Derbentseva & Kwantes, 2014).

Parts A, E and F of the questionnaire helped us to understand how the academics connect research and teaching and to identify any inconsistencies in his discourse. For instance, if in Part A he affirmed that his teaching practice is informed by research, but in Part F it is written that he cannot connect research and teaching in his academic life, we can identify an inconsistency that needs to be clarified. In this case, we could create a proposition with a question mark (e.g., Teaching – is informed by (??) → Research) and ask him to clarify and explain these propositions during a meeting, by e-mail or prompting a question in an automatised system. At this point, the degree of feedback that is given to the mapper and the support given to edit the map is a critical stage to foster higher level thinking skills through concept mapping.

*3.3    Comparing the Concept Maps: a Focus on Structure and Content*

As we can see in Fig. 1 and Fig. 3, the interview-driven and the questionnaire-driven concept maps are quite different considering both graphical structure and content accuracy. For instance, both maps have approximately the same number of concepts (8 and 9, respectively), but the interview map is smaller and hierarchical. During the interview, the interviewer must seek to ensure that linking phrases are adequately labelled to provide meaning and to maximise the explanatory power of the map (Kinchin, 2016). The ability to be concise and clear, looking for conceptual relationships that are entirely relevant to the context may result in a map being reduced in overall size as it is refined and edited (Cañas, Reiska & Möllits, 2017). On the other hand, the questionnaire provides a great amount of information that can be incorporated on the map without previous discussion or adequacy judgments, increasing the number of concepts and their interconnectedness; as a result, we will see a higher propositional density (see Silva Jr, Romano Jr., & Correia, 2010) tending to a network structure (Kinchin, Hay, & Adams, 2000).

Despite the fact that both maps were about research-teaching nexus in higher education, their degree of content accuracy is quite different. The level of accuracy can be evaluated on how close the content represented in the map reveals the actual views, beliefs, conceptions, ideas, values of the academic. The questionnaire map represents the academic's more general, broader and non-personalised ideas about the topic while the interview map has more idiosyncratic features. For instance, during the interview, the academic included in the map the proposition "Teaching involves the transmission of knowledge" (see Fig. 1), while in his response to the questionnaire he "slightly disagree" to the statement "Teaching means transmitting new knowledge" (see Fig. 2). Apparently, it seems to have a contradiction in his discourse, but during the interview he could explain in detail what he meant by "transmitting knowledge" as we can see by the following extract:

> *"Beware with 'transmitting', but anyway, I'm transmitting something to my students because I'm not going to 'discover' the disciplinary content. […] I use the verb 'transmit' to convey a message of opposition to 'produce' knowledge. There is an assumption that teaching involves working with the knowledge that already exists. However, if I'm working with a knowledge that does not exist yet, then, this is research"* (Extracted from the transcribed interview from 2'21" to 3'56").

In the case of the questionnaire, the academic was not allowed to justify his point of view during the task, decreasing his level of agreement when judging the statement. For him, teaching does not **mean** exactly transmitting knowledge but **involves** the transmission of new knowledge (in a contrast of researching). The same pattern has occurred for the academic's examples of rewards, recognition and status. During the interview, neither interviewer nor interviewee has engaged in a discussion about this issue; as a consequence, the examples did not appear on the map (Fig. 1). On the other hand, one part of the developed questionnaire had the purpose of eliciting such examples (Part D, Table 1 and Fig. 2), which resulted in such information on the map (Fig. 3). These findings reveal the subjective nature of research and teaching within higher education, providing a glimpse of the idiosyncratic nature of the values that underpin academic identity.

*3.4    Comparing the Concept Mapping Approaches: a Focus on Strengths and Weaknesses*

In order to compare both approaches for concept map elicitation (interview and questionnaire) described and discussed in this study, some strengths and weaknesses were identified (Table 3). The interview-driven methodology suggests a way forward to the development of bespoke, dynamic and person-centred faculty development by providing a deep self-reflection of research and teaching within higher education. Moreover, the co-constructed concept map was obtained as a result of a rich dialogue about the topic during the interview. However, these benefits were likely to be raised when not only some amount of time is dedicated for the interviewing process but also the interviewer is an expert in concept mapping and academic development.

The questionnaire-driven methodology suggests a way forward to the development of user-friendly, fast-track and self-paced faculty development. Moreover, the protocol used to construct the concept map from the academic's responses can be easily automated and, consequently, be adopted for large scale purposes. In this case, well-structured activities can provide the necessary scaffolding for concept map elaboration in a brief and single application. However, the monologic aspect of this process results in a broader and generic view of research and teaching within higher education.

**Table 3.** Some strengths and weaknesses of the approaches for concept map elicitation (interview and questionnaire).

| | INTERVIEW-DRIVEN CONCEPT MAPPING PROCESS | QUESTIONNAIRE-DRIVEN CONCEPT MAPPING PROCESS |
|---|---|---|
| **STRENGTHS** | Bespoke<br>In-depth<br>Person-centred<br>Dynamic and dialogic | Suitable for large-scale<br>User-friendly<br>Fast-track<br>Self-paced |
| **WEAKNESSES** | Time-consuming<br>Concept map expert dependent | Broader and generic views outcomes<br>Monologic |

The questionnaire-driven concept mapping process might provide the academic with an example of an excellent concept map produced from the questionnaire results. This map can now be used to promote dialogue about quality enhancement in research and teaching during a **step-forward** interview with the academic developer. A broader and generic concept map can be used as a starting point for discussion by offering a way to uncover, visualise and share the most important ideas in the academics' minds. This might offer a way to decrease the time spent for the interview.

## 4    Final Remarks

It is evident that the procedure used to construct concept maps from research participants can influence the final product as well as the researcher approach during the map elaboration. Whilst there may be practical steps to reduce this influence, it is clear that research reports that use concept maps of participants' knowledge as a source of data need to be explicit about the ways in which concept maps are elicited. Summary comments such as "concept maps were collected from participants" are too vague and leave too much potential for variation in structure and content to cloud any conclusions based on concept map analysis.

The quality of maps elicited also needs to be made explicit – preferably with an illustrative example. Whether concept maps were simply "competent" (where participants included relevant content) or "excellent" (where participants were supported in their reflection on and refinement of the maps) is of great significance when making research claims. It is possible that excellent concept maps are more likely to be obtained through an interview protocol where an interviewer is able to probe the interviewee's understanding and invite editing and refinement. This may be more difficult to achieve in an automated online environment. On the other hand, concept map-based interview is time-consuming and concept map expert dependent, which difficult its application for academic development in large scale. In this context, engaging with the questionnaire can be useful for providing the academics with an example of a "competent" map, sensitising them to the core concepts involved and the possible links between research and teaching within higher education. Moreover, an online questionnaire may facilitate the application of the pedagogic frailty model by scaling up the mapping process.

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