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Doctoral Students' Conceptions of Research

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In this paper I report a study of the conceptions of research held by a sample of doctoral students at an Australian research-intensive university. I take a unique approach by using metaphor analysis to study the students' conceptions. The students in this study were recruited for an on-line survey in which they answered questions relating to their conceptions of research. I arrived at four categories that I have labelled research is explorative, research is constructive, research is spatial, and research is organic. Key Words: PhD Students, Conceptions, Metaphors, Metaphor Analysis

There has only been a limited number of studies about the conceptions of research amongst different groups of university people such as academics (Åkerlind, 2008; Brew, 2001), supervisors (Bills, 2004; Kiley & Mullins, 2005), postgraduate students (Meyer, Shanahan, & Laugksch, 2005, 2007) and postdoctoral researchers (Pitcher & Åkerlind, 2009). These studies used various methods such as phenomenography, participant-observation, focus group conversations, surveys, and questionnaires to explore the participants' conceptions of research. I argue that providing another perspective on students' conceptions of research can give the reader another view of an important area of research and broaden his or her understanding of the topic.

There has been no general agreement as to how conceptions of research should be named or described. All the studies that have been performed to date have produced different descriptions and categories of conceptions of research. In this paper I offer a set of descriptive labels that illustrate the participants' conceptions as well as telling us something about their approaches to research.

In this paper I propose these questions:

1. What are doctoral students' conceptions of research?
2. How are those conceptions revealed by the metaphors they use in describing their research?

It is my intention to add another perspective to the growing literature on conceptions of research, and add to the literature on doctoral students' conceptions of research. It is important that doctoral students' conceptions of research be understood, particularly by those who supervise the students. A mis-match between the supervisor's and the student's conceptions of research may lead to problems with the supervisor/student relationship and thus to the student having problems with his or her research and/or not completing the PhD (Bills, 2004; Lee, 2008). If the supervisors are aware of their students' conceptions of research then steps can be taken to reduce the risk of complications arising from a mis-match. Therefore, my results should be of interest to both supervisors and students and may help to raise the level of understanding between

supervisors and students. If that understanding can be increased, then the possible problems for the relationship and the student might be avoided.

The research reported in this paper was conducted under the rules of the Ethics Committee of the Australian National University, Australia. Ethical clearance was sought and approval was granted before the research was undertaken.

Review of the Literature

Students' Conceptions of Research

The literature on postgraduate students' conceptions of research is limited. As far as I have been able to ascertain there have been only two studies, by the same researchers, that specifically examined postgraduate students' conceptions of research. In their study, Meyer et al., (2005) aimed to produce an empirical model from the results of their analysis of the material gathered from 154 Australian and South African postgraduate students about their conceptions of research. The authors state that their aim was to find variations in how research is done and conceptualised to find out how postgraduate students' learning can be related to their research outcomes. The authors suggest that the outcomes of students' research were influenced by the ways in which students think, which in turn was likely to be dependent upon a number of factors internal and external to the student, such as motivation and knowledge of the subject acquired before the research begins. The students were likely to perceive their research in ways influenced by these factors, so they must be taken into account when analysing the data (Meyer et al., 2005).

In the questions provided by Meyer and his group, the postgraduate students were asked to describe, from their own point of view, how they would explain research to a stranger, how research is seen in their discipline, why research is done, what successful researchers actually do, and what constitutes good research (Meyer et al., 2005). The students' answers to these questions provided the data which the authors then qualitatively analysed.

On the basis of the initial qualitative analysis the authors formulated eight categories relating to conceptions of research (Meyer et al., 2005): (a) research as information gathering, the emphasis being on collecting as much information as possible to solve a problem; (b) research is about discovering the truth searching for and establishing the truth or validity of a topic through research is important; (c) research is about insightful exploration and discovery and is a way for researchers to seek new insights into existing knowledge; (d) research is about analytical and systematic enquiry, the process of research is systematic and directed at a particular purpose; (e) research is about incompleteness; research is seen as never ending in that there is always something new to be determined from new or old data and facts; (f) research as the re-examination of existing knowledge, research into old topics is useful in that it can produce new insights or conclusions or be a check for the validity of old ones; (g) research is problem based (e.g., the process of research is to identify problems, study the problems and solve them); and (h) misconceptions about research (Meyer et al.)

In discussing the results of their study of postgraduate students' conceptions of research, Meyer and his co-authors note that "it is clear that the sample that they

substantively constitute does not exhibit a uniform approach to conceptualizing research or the research process" (Meyer et al., 2005, p. 236). This finding was understandable since the students bring their own cultural backgrounds and previous knowledge to their research and they will thus show the variations in personality and outlook that make them individuals.

The authors set out to test whether the findings presented in the first study could be empirically verified by examining a new group of postgraduate students and experienced and inexperienced researchers. The second episode of research was based on that new set of collected data and continued their investigation of students' conceptions of research as described in their first article (Meyer et al., 2005). The second investigation used quantitative methods rather than the mixed quantitative and qualitative methods of the first study. The new investigation was found to confirm the previous findings. The authors add that the categories found by the new investigation were "conceptually virtually identical" to the ones reported in the previous article (Meyer et al., 2007, p. 429).

The two articles discussed above by Meyer, Shanahan, and Laugksch (2005, 2007) appear to be the only ones that investigate postgraduate students' conception of research, although there is some literature on other types of students' conceptions of research. As they point out, they were unable to find any literature on postgraduate students' conceptions of research prior to writing their articles. They state that "no such acknowledged literature . . . appears to exist" (Meyer et al., 2005, p. 229), and they add that they "are not aware of any other empirical studies on this topic" (Meyer et al., 2005, p. 230).

Metaphor Analysis

Although there is not a great deal of literature specifically on students' conceptions, there is literature on the use of metaphors to investigate various types of conceptions (for more discussion on this point see Andriessen & Gubbins, 2009; Martin & Lueckenhausen, 2005; Moser, 2000; Schmitt, 2005; Steger, 2007). Many of these writers make the point that metaphors are often unconsciously generated. It is for that reason that metaphors are a useful way of investigating people's conceptions. Since the metaphors are often unconsciously generated they will reflect the person's underlying feelings and understanding, which they may be unable or unwilling to express consciously.

As the name implies, metaphor analysis is a systematic method of analysing the metaphors that people use to express themselves. It is a means of gaining understanding of a person's often unconscious motives and reasons for doing something or of their conception of the process involved in doing it. It can reveal the thoughts behind the action. Martin and Lueckenhausen (2005) add that metaphor analysis as a method can be used by the researcher to focus on what individuals say and think about what is happening to them.

The text to be analysed by metaphor analysis may be a body of literature, the response to an interview, or other written material. Written material is used so that it may be conveniently examined a number of times to ensure that all the metaphors are found. Indeed, the search for, and finding of, all the dominant metaphors is of the utmost

importance for the following analysis. The material has to be examined closely then examined again and again to ensure that all the metaphors are found. This step is particularly important as some of the metaphors might be obscure and might be missed on the first, or even second, reading.

Metaphors We Live By, as written by George Lakoff and Mark Johnson in 1980, is the seminal work on metaphor analysis. Although the authors do not provide a method of analysis, they do show how metaphors can be grouped into metaphorical concepts which are important for any method of analysis of metaphorical terms.

The metaphorical concept is an important feature of the work. It relates the target and source domains of the metaphor in the statement, *target domain is source domain.* Thus, if a person uses the metaphor of a journey to describe his or her research then the concept might be "research is a journey." In this example, "research" is the target domain and "journey" is the source domain since "research" is the subject of investigation and "journey" is the domain to which it is linked by the metaphor. Part of the metaphor analysis process involves forming metaphors into concepts, which illustrate the relationship between the target domain and the source domain (Lakoff & Johnson, 1980).

The metaphors found do not occur by chance, says Schmitt (2005), but are parts of a limited number of concepts that have the target and source areas in common. The metaphors, when found, should be grouped into their metaphorical concepts. "The formulation of metaphorical concepts requires a creative, synthesizing approach," notes Schmitt (p. 372).

In discussing the validity of metaphor analysis and the means of obtaining it, Schmitt (2005) suggests that in using metaphor analysis researchers must provide the possibility of testing their accuracy and credibility. The ways in which the work is to be validated should not be merely applied to the actual analysis but should be applied throughout the whole investigation including the data collection and reporting of results. It is important, he says, that the whole process should be documented. To satisfy this requirement I provide a full explanation of the approach taken in this study.

Moser (2000) presents a number of arguments why metaphor analysis should be considered an important research method and why it can provide useful interpretations of a person's thoughts and attitudes. She argues that metaphor analysis offers "a multifaceted research perspective" (p. 4). Metaphor analysis can become either a quantitative or qualitative method by associating metaphors with topics, Moser argues. However, she states that it is qualitative metaphor analysis that is the most important since it brings out the full potential of the method. A person's actions and thoughts may be characterised by the metaphors he/she uses in describing them. The use of qualitative analysis allows those metaphors to be placed in their correct context and related to the topics with which the person associates them (Moser).

Martin and Lueckenhausen (2005) say that metaphor analysis is able to show how the individual feels about something. Further, they go on to say that the individual does not use only a single metaphor but uses a number of different ones to express different ideas and feelings, that "[t]here is a *range* of cross-mapping between abstract thought and concrete objects" (Martin & Lueckenhausen, p. 392, emphasis added). Thus the proper and complete analysis of the material necessitates that the researcher be open to the thoughts and feelings of the speaker or writer (Martin & Lueckenhausen).

From the above discussion, metaphor analysis can be seen as a useful tool with which to investigate the motivations and attitudes of people. The metaphors that people use to express themselves are largely unconscious and indicate a great deal about the person's hidden thoughts and emotions. Thus metaphor analysis is a useful way to investigate the conceptions of research held by doctoral students.

Methodology

Validation and Credibility

Schmitt (2005) stresses the need for metaphor analysis to be validated and credible. The way to achieve those requirements, he says, is by fully documenting the steps taken. It is important that all the steps be documented so that others are able to follow, and can comment on, the procedure used. At various stages in the analysis I shared the results with a colleague. These discussions occurred whenever any new decision was made and at least three times during the work on the data. Through these discussions with my colleague, I gained an alternate view and help in providing validation of the results. These discussions allowed the results to be checked and any errors in either results or procedure found before they affected the final outcome.

Data Collection

The participants in this study were doctoral students at a research-intensive Australian university. An email message was sent to all doctoral students in the university inviting them to take part in an on-line survey.

I developed the survey using APOLLO (2008), the university's on-line polling system. It was trialled on a group of postdoctoral researchers before being offered to the PhD students. The survey approach was taken to avoid any possible influence that the presence of the interviewer might have on the respondents. By supplying the PhD students with questions in the form of an on-line survey, all were presented with the same questions in the same manner. Thus any influence due to inflection or embellishment of the questions by a live interviewer was avoided.

I asked the students to imagine that they had received an email from a friend interstate who was just completing a coursework Master's degree in the same discipline in which they were doing their PhD study. The friend says that she has been invited to do a PhD but was not sure whether she will or not. She says, "I'm not really sure I want to be a researcher, or what doctoral research is all about." She then asks a number of questions to which the student was asked to respond by writing his or her answers. The questions asked were "What is doctoral research all about? What do you actually do in your doctorate? Why do you do those things? What's the point of the research you do?"

All the doctoral students in the university received the invitation to participate via the Graduate Convener in their area: The number who actually received the survey is unknown since there was no feedback from the Graduate Conveners. The students gained access to the survey by clicking on a link in the email message. Fifty-nine students responded positively by taking the survey.

I conducted the on-line survey in early 2009 at an Australian research-intensive university. The participants came from across the campus and represented a broad variety of disciplines and areas of study, ranging from philosophy, demography, and law to mathematics, ecology, and anthropology. Of the participants 34 were female and 25 male, 46 were domestic students and the remaining 13 were international students. Their full-time equivalent years of candidature ranged from one to more than five.

Data Analysis

In order to analyse the data, the students' responses to the survey were printed and the responses used for the metaphor analysis that followed.

I began by reading each response through thoroughly to familiarise myself with the contents. As I read each one I marked the metaphors that I found. A day was left before reading them again, and then the process was repeated a third time. A day was left between reading to allow a fresh look at the students' writings. Three readings were necessary to ensure that any metaphors missed on the first or second readings were found. As well, I took care that only metaphors referring to the topic being investigated were marked; because some related to other matters I ignored them.

As I read each response I considered every word and phrase to decide whether or not it was a metaphor. I had to decide if each phrase was used literally or metaphorically in deciding whether a word was used metaphorically or literally, I used a dictionary to provide the literal meaning. Words used literally are not metaphors. Each phrase or word had to be considered in the context of the remainder of the response. At this point the results were discussed with a colleague to make sure that all the metaphors had been found.

After the three readings of the response each was taken and the metaphors found in it written on a sheet of paper. Related metaphors were then linked together and thus all the metaphors in the response were mapped onto each other and were grouped into metaphorical concepts. Andriessen and Gubbins (2009) point out that the greatest number of related words or phrases indicates the metaphorical representation that was most important to the person, thus the concept which was represented by the most words or phrases was named the *dominant concept*. When the respondent used a number of metaphors relating to more than one conception, the conception that was illustrated with the largest number of metaphors was considered to be the dominant one, in line with Andriessen and Gubbins' statement. Again, at this point I checked the results by discussing them with a colleague. Following the analysis of the metaphors within each response the dominant metaphorical concepts from all the responses were grouped together into categories. I gave these categories the same names as the dominant metaphorical concepts they contained. For instance, responses that had the majority of metaphors relating to an area, such as "field" were placed in the category of "research is spatial". A further example is given below. Each category can be seen as representing the conceptions of research that appear in the responses placed in that category. I found that every response could be allocated to a category so it was not necessary to devise any new ones. I again discussed the categories with a colleague.

The metaphors I found in one category of response and the dominant metaphorical concept derived from them is shown in the following example taken from

one response. This participant referred to the "field" three times. The "wrong direction" was referred to and also a "dead end." As well there were references to "the first steps," a "hurdle," and did not know "where it would end up." It can be seen that all these metaphors refer to what might be features of traversing a landscape of exploration and discovery, so that the dominant metaphorical concept was *research is spatial*.

Of course, these concepts were not decided on the basis of one response alone. Across the responses, related metaphors emerged regularly. I tried to identify every metaphor within every response by each of the students. Then I took the metaphors out of their context and looked for similarities in the metaphors used across responses. I found four categories or groupings of related metaphors. Then I had to decide what conception of research that group of metaphors was reflecting and give that metaphorical concept a label. Lastly, I returned to the individual responses and counted the number of metaphors used from each category to determine which metaphorical concept was dominant for each response.

I thus identified the dominant metaphorical concept from the fact that more metaphors were found belonging to that concept than any other concept in the response (Andriessen & Gubbins, 2009). As a final check on the results I again discussed them with a colleague, and some changes were instigated which improved the quality of the analysis.

I allocated all responses to a dominant metaphorical concept. There were none that I could not so allocate. As well as the dominant metaphorical concept expressed in the response, there were, in many but not all cases, minor metaphorical concepts that related to categories other than the one in which the response has been placed. Those minor metaphorical concepts were less represented by metaphors than the dominant concept, which determined the category into which the response was placed. The minor metaphorical concepts fell within the same categories as the dominant concepts so it was not necessary to formulate any new categories to represent them.

There were some times, but not all, that I found other minor metaphorical concepts in the response. The dominant metaphorical concept was always represented by more members than any minor metaphorical concept. The difference in the number of members between the dominant and the minor metaphorical concepts ranged from marginal to total. Some, but not all, responses contained a minor metaphorical concept as well as the dominant one.

Although there was some overlap between dominant and minor conceptions I did not feel the need to form subcategories for those overlaps. The overlaps were minor and only appeared in some responses. The overlaps only show that the respondents' conceptions had some minor variations. In no case was the minor concept significant to any great extent. I here discuss the overlap only for completeness and to show that it existed. It did not influence the decisions regarding the dominant conceptions.

Martin and Lueckenhausen (2005) stress the importance of sharing the findings with other people as a check on the validity and reliability of the findings in metaphor analysis. This point is also made by others in the field such as Steger (2007) and Schmitt (2005). Martin and Lueckenhausen make the point that "the insight and evidence has to be communicated, evidence has to be collected and others beyond the immediate research group have to be convinced" (Martin & Lueckenhausen, p. 394). Thus it is suggested

that sharing and discussing the process with colleagues is necessary as a check on the reliability and validity of the results derived from the material being analysed.

Results

My analysis produced four dominant metaphorical concepts: *research is explorative, research is constructive, research is spatial,* and *research is organic*. The names I have given to the concepts reflect the participants' conceptions of research as shown by the metaphors they used in their survey responses.

The categories can be taken as representative of the doctoral students' conceptions of research found in the responses. I describe the categories below with examples of the concepts and metaphors taken from responses that fall within the categories.

In the explanations of the categories below, I describe responses in that category and use them as examples. I use them to show the manner in which the dominant metaphorical concept and categories were arrived determined. The examples described can be taken as examples of all the responses placed in the category. The examples of the metaphors given are typical of the responses in the category. The same metaphors appeared repeatedly in the responses in a particular category. Thus they can be taken as representative of the responses.

In my study responses placed in the category of *research is explorative* form by far the largest grouping. The categories of *research is constructive* and *research is organic* contained much fewer responses. Why there should be such a disparity in the number of responses belonging to the respective categories was not apparent to me from studying the responses nor from considering the demographic data.

Research is Explorative

Responses in this category typically contained metaphors relating to a journey of discovery and exploration. They sometimes described research as "going off in another direction" or to the need to "pursue one's interests." The feeling was that the participant saw research as heading off into the unknown in search of the treasure of knowledge.

One of the responses in this category referred to research being "on track" or maybe "going too far down the wrong track." There's "no end to it," and "it's easy to drown." Another response referred to the work for gaining the PhD as "uncharted waters" thus using that metaphor to indicate the search into new areas or research. References to "explore", "exploration" and "discovery" were common in this category and appeared in many of the responses. It can be seen that all the metaphors in these responses referred to research being a journey of discovery and exploration of the unknown. Therefore the dominant metaphorical concept was *research is explorative* and the responses were placed in that category.

Research is Spatial

Responses in this category typically referred to research covering an area of interest. For instance they might refer to "areas" of knowledge or the "field" of interest.

There was a feeling that the participants wanted to spread out and cover an area of interest in their research, looking for results that would answer a question and provide the reward of greater knowledge.

One response in this category spoke of "the field" of research twice, and "regions of thought." The "regions" were seen as "still virgin." The metaphors related to research as an area of study with aspects of space being important. This response was therefore placed in the *research is spatial* category. Another response in this category referred to "the path" twice and the "road" to discovery. I thus placed this response also into the category of *research is spatial* since the metaphors give a feeling of openness and space.

Research is Constructive

The single response in this category referred to research as adding to the edifice of knowledge. There is a mention of "adding another brick to the wall" and "building" knowledge. "Filling the gaps" was also another metaphor in this response. There was a feeling that the person wanted to help build and improve knowledge by adding to what was already known.

The response referred to "constructing a research question" and "constructing a research methodology." Thus it was apparent that this response had the dominant metaphorical concept of building the products of research and so was placed in the category of *research is constructive*. The response also referred to the need to "narrow your scope." This forms a minor metaphorical concept where research is explorative and thus this response can be seen to overlap the category of *research is explorative* slightly. That is, it slightly overlapped a category other than the one containing its dominant metaphorical concept. Since I found only one response in this category no further examples of the metaphors used in other responses can be given.

Research is Organic

The responses here used metaphors relating to life and living things. Responses in this category might refer to the "body" of knowledge and the need "to go with the flow" to "produce" knowledge. The metaphors gave the feeling of research being alive and organic for the researcher.

One of the responses in this category said that ideas "might well feed off each other" to "produce knowledge." These metaphors were placed in the dominant metaphorical concept of *research is organic*. The response also referred to the "field" of research, forming the minor metaphorical concept of *research is spatial*. Thus this response overlapped a category other than the major one that contained its dominant metaphorical concept.

Another response that was placed in the *research is organic* category referred to "the long run" of research and the need to "go with the flow." For those reasons I placed it in the category of *research is organic*. This response also had the very minor category of *research is spatial* as it once referred to the "field" of research.

A further response contained a reference to the "research issue" and the way in which it contributed to the "body of knowledge". Again, there is a feeling of the research

being alive for the researcher. Thus this response was also placed in the category of *research is organic*.

The minor category of *research is spatial* appeared to be fairly common for responses in the category of *research is organic*. It can be seen that two of the responses used as examples above had it as a minor metaphorical concept.

Discussion

The reader will note from the above descriptions of the formation of the categories that some responses overlap categories other than the one to which they were allocated. However, not all do so. Some had only metaphors that related to their dominant metaphorical concept and others had minor metaphorical concepts. Why this difference should occur was not immediately apparent from the analysis. Perhaps some participants did not need to use minor concepts to express their conceptions of research. It can be surmised that some participants had a broader conception of research and so needed a wider variety of concepts to express them, or that they had different conceptions of research in different situations. Again the difference was not apparent from the responses.

It was apparent that there were no differences in the dominant metaphorical concepts that related to the students' area of research. I found that the dominant metaphorical concept was not discipline-specific even though there were a wide variety of disciplines represented from biology, physics, and earth sciences to law, linguistics, and anthropology. It would follow that the conceptions of research were also not discipline-specific. Also there was no apparent association between dominant concept and demographic factors such as gender, period of candidature, or cultural origin.

The four categories that emerged in this study, *research is explorative*, *research is spatial*, *research is constructive*, and *research is organic*, tell us something about the students' understanding of what research entails. The responses in each category describe research differently and indicate different conceptions of it. The responses show research as exploration and discovery, as a field of interest and discovery, as a contribution to the erection of an edifice of knowledge and as the development and growth of an organic entity, respectively.

There were some similarities between the results of this study and those of Meyer et al. (2005) described above. The categories found in this study do not correspond exactly with those of Meyer et al. but, rather, overlap the categories of that study to some extent. My category of *research is explorative* relates to Meyer's et al.'s "research is information gathering," "research is about discovering the truth," and "research is about insightful exploration and discovery." The category from this study named *research is constructive* corresponds to Meyer et al.'s "research is about incompleteness" and "research as the re-examination of existing knowledge." My category of *research is organic* has similar characteristics to those in the category that Meyer et al. name "research is information gathering." My *research is spatial* category was similar to Meyer's et al.'s "research is information gathering" and "research is incompleteness" categories. It can be seen that the categories found in this study cannot be mapped in a one-to-one relationship with those of Meyer et al.; there was some overlap but some categories from Meyer et al. do not appear in the results of this study. It is suggested that

the differences in results reflect different methods and different questions asked in Meyer's et al.'s study and this one.

Since the same categories were found in this study as those described in a previous paper, which reported a study of the conceptions of research held by post-doctoral researchers (Pitcher & Åkerlind, 2009) it was useful to examine the relationship between the results described in the two studies. The categories of *research is explorative*, *research is spatial,* and *research is constructive* were of a similar size in the two studies. This suggests that the occurrences of those conceptions of research have approximately the same proportions amongst post-doctoral researchers and doctoral students. A difference that may be significant, though, was the proportion of responses placed in the category of *research is organic*. In that category there was a large difference in favour of the doctoral students. This suggests that doctoral students were much more likely than post-doctoral researchers to see research as a living, growing entity. The major difference between the groups was that the post-doctoral researchers had completed their PhDs, in some cases many years prior to the interviews, and the doctoral students were still studying for that degree. Why this difference should be so important, if it is the cause of the difference, is not apparent from the data gathered.

Conclusions

My aim in this study was to devise a set of categories that reflect doctoral students' conceptions of research. I achieved that aim by analysing the responses to an on-line survey completed by a group of doctoral students in a research-intensive Australian university. In reporting the study I have added to the literature on students' conceptions of research and, in particular, the conceptions of research held by doctoral students.

In this study I have shown that doctoral students' conceptions of research can be placed into categories that indicate something about the participants. The categories were named for the dominant metaphorical concept that appeared in the survey responses of the participants who fell into the particular category. The participants' conceptions of research were indicated by the dominant metaphorical concepts. There does not appear to be any relationship between the students' conceptions of research and other factors such as gender, year of candidature, or discipline. The results I have discussed in this paper were found during an early stage of analysis. My work will be on-going for some years yet so the possibility of revision is always present. However, my results did offer some useful insights and ideas at the time of analysis which have proved important in furthering the work; that further work has shown that these early results were worthwhile, offered some useful insights and, hence, are worthy of disseminating.

I suggest that an understanding of conceptions of research is important for those who supervise others since mis-matches in conceptions can cause problem in communications (Bills, 2004; Lee, 2008). If supervisors understand their students' conceptions then they can allow for any differences between the student's conceptions and their own. Avoiding problems due to mis-matches in conception can help reduce the problems that the students encounter and thus help them to do better research and complete their doctorates.

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