

The Lived Experience of Nurses Working in Cardiology Services with Online Continuing Professional Programs in Advancing their Specialized Clinical Practice: Phenomenology Study Analysis

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Abstract:

Introduction: Cardiology nursing is one of the most challenging nursing specialties. Online continuing professional development (CPD) programs may allow nurses to fulfil the demand for specialty competency.

Methods and materials: This manuscript described the process of data analysis and discusses the philosophical and theoretical frameworks that shape this study. The study was conducted in one of the largest accredited teaching hospitals in South Australia.

Results: Volunteer participants were interviewed where each participant was given a pseudonym to protect confidentiality. First, interviews were transcribed manually. Transcription is considered an interpretive act and a perfect way to immerse oneself within the data because it helps create initial meanings. Second, the researcher listened to each interview while checking compatibility with the transcript. Third, the researcher read and re-read transcripts and highlighted essential ideas before the coding process. Repeated transcript reading helped develop main ideas, recognise shared thoughts, meanings, and patterns, and identify potential themes. Furthermore, it was evident during this stage that some of the researcher's pre-assumptions regarding the phenomena were revealed in certain aspects of nurses' lived experiences. In addition, audio recordings and a reflective diary were utilised to reveal non-verbal clues of participants, adding depth and transparency to data analysis. The final step involved writing a summary for each transcript containing the main ideas.

Conclusions: It is apparent that six main themes were embedded in the lived experiences of the RNs working in cardiac services and using the online CPD course to advance themselves knowledge and skills.

Keywords: cardiology; nurses; education; on-line; continuing professional development (cpd); competency

Introduction

The health care is advancing on a daily basis and education of the health care staff is of paramount importance. Nurses are the corner of the health care system worldwide. Hence, preparation of a manual of professional ethics, development of a career structure for nurses, setting standards of nursing education; nursing practice, and issuing guidelines for registration and licensing would further enhance the population health perspectives [1-4].

Development and advancement of medical knowledge has a noticeable impact on the nursing profession [6]. Today, nurses are expected to possess knowledge and skills beyond basic nursing knowledge [6] Upholding the profession identity requires constant updating of nursing professional knowledge related skills [7,8]. Continuing professional development is a core learning method for professional practice and a shared responsibility between the organisation and nurses [6].

Nurses working in a specialised clinical environment are challenged with dynamic changes in patient needs and rapid development of the care delivery system [10]. Cardiology is a very challenging specialty, and cardiology nurses need to possess high-level knowledge and skills to assist them in appropriate decision making. Silva and Ferreira [11] emphasise that the evolution of research and technology in the clinical specialist area requires new knowledge and skills for nurses to prepare them to respond effectively to special, complex needs.

Fundamental nursing knowledge and skills are insufficient to meet patients' changeable and complex needs within specialised settings [12-15]. Silva and Ferreira [11] emphasised that specialised knowledge and experience work together to achieve effective interaction between the health professional and patients with specific needs. In other words, quality nursing care relies on specialised knowledge [16]. Therefore, nurses must be equipped with advanced specialised knowledge to understand disease progress and meet complex patient needs [5, 17-19].

There is a need to describe the process applied to analyse participant interview transcripts. Data analysis in a qualitative approach is a complex and unique process [20-22]. A phenomenological approach specifically attempts to unveil the meaning within the phenomena embedded in the lived experience to develop a deep understanding [23]. To achieve this, the researcher must become deeply immersed in the data and implement their own intuition, images and experiences in dissecting patterns and developing categories to reach a conclusion [24]. Also, the researcher must use a process that appropriately reflects the participant experience within transcribed interview text. Thematic data analysis was the most suitable approach for data analysis in this research, helping to unveil structured meanings of the individual's experience.

Hence, this manuscript provides an informative description of the data analysis process. Thematic data analysis guided by Braun and Clark's six step thematic data analysis model is explained. Each step is thoroughly described and six themes emerging from this study were revealed and defined.

Method:

This is described earlier in previous publication [25]. In summary: the study was conducted in one of the largest accredited teaching hospitals in South Australia. This hospital provides many cardiac services for patients from South Australia, the Northern Territory, and South East Asia who are referred from the AUS-health services. The cardiology department is divided into two main units: the cardiology unit which provides medical and interventional cardiac services and the cardiothoracic unit which provides surgical services. The department is staffed by a specialised multi-professional team, some of whom have completed specialised cardiac post-graduation diploma courses in order to meet the complex needs of cardiac patients. To keep the team abreast of the latest developments in practice, the in-service education department at local study setting runs several continuing professional development (CPD) programs for the cardiology department via varied learning modes, such as online CPD programs, classroom learning and bedside-based learning. The nursing team maintains advanced clinical skills through online CPD, orientation programs, and in-service classroom-based courses. Regarding online CPD courses, electrocardiography interpretation and underwater sealing draining management courses are mandatory courses which all registered nurses must complete while working in medical or surgical cardiac wards [25, 26].

Initially, this study explains the development of hermeneutic phenomenology. Then, it presents significance of the application of hermeneutic phenomenological research in the nursing profession. Finally, it provides a detailed discussion of van Manen's methodological research structure that guided exploration of the lived experience. It describes the process of data collection. Starting with a detailed description for the study setting, then sampling and recruitment procedures are stated. Also, it explains the phenomenological interview process conducted by the researcher to explore the registered nurse experience as gathered through a systematic process.

Participant profile

Five volunteer participants were interviewed for this study. Each participant was given a pseudonym to protect confidentiality. A brief description of each participant is given below.

Ann

Ann is a 23-year-old junior registered nurse, who has been working on a cardiology ward for one and a half years. Ann enrolled in the online ECG interpretation course and successfully completed four of the twelve modules. She found the course well structured, easy to access and progress through, and relevant to actual practice. On the other hand, she found that the course lacked critical thinking components as it only focused on essential assessment and management. Also, she pointed out that it is hard to understand all parts of the ECG rhythms online, as she experienced ECG in real practice as more complex than the scenarios shown in the course, and consequently, she needed to seek clarification on some points to resolve her queries and help her to interpret ECG rhythms. She did most of the course in her own time at home and dedicating time to completing the course. It was a priority for her.

Brenda

Brenda is a 59-year-old registered nurse who has been working on cardiology wards for five years. She was enrolled in two online mandatory courses: the ECG interpretation course and the underwater sealing drain (UWSD) management course. She found these courses enlightening, educational, and relevant to actual practice. She expressed the view that the courses helped her to bridge the gap in her competencies as the courses were comprehensive. The online courses provided her with flexibility in terms of seeking particular knowledge she needed; however, the busy nature of ward work did not permit her to acquire such knowledge on the ward. Therefore, she dedicated time to study at home which was not pleasant for her. She had to use multiple resources, such as mentors and online resources, to aid her understanding of topics for which she needed further clarification. She supports the idea of having classroom time or bedside clinical instruction sessions on a regular basis to help shape knowledge gained from online CPD courses. Finally, she was satisfied with the knowledge she gained, describing it as advanced, and she was able to utilise it to provide patient education and junior nurse mentorship more effectively.

Lucy

Lucy is a 24-year-old registered nurse who has been working on a cardiology ward for one and a half years. She joined cardiology services because of her interest in becoming a cardiology nurse. She successfully completed the online ECG interpretation course, which she described as good, accessible and flexible. She found its best feature and greatest advantage as being available online, even after completing it. Now the information is still available when she wants to reflect on actual practice she has experienced. On the other hand, the course's disadvantage was that there is a lot of

information that must be taught in a short period. She supports the concept of having classroom sessions embedded within the course as that allows the learner to revise what has been learned online, question, and seek further explanation. She stated that she had to dedicate time to do the course at home. She was unable to benefit from accessing the course at work as the ward is always too busy. She stated that her cardiac clinical practice is gradually advancing with the assistance of the course content continuing to be accessible.

Mary

Mary is a 30-year-old registered nurse, who has been working on cardiology wards for six years. She did the online ECG interpretation course, although she was unsure how she would cope with an online course. She reported that the purely online nature of the course did not meet her learning needs which she attributed to her own method of learning. It was difficult for her to learn from a computer and totally absorb all that she read on that from the computer screen. She stressed that she is a person-to-person learner and her learning is achieved through discussion. Therefore, she recommends having a clinical instructor attached to the course to answer questions from students seeking clarification of online components, and to discuss case studies and examples of ECGs brought by the staff from their clinical settings. On the other hand, she considered the advantages of having an online ECG interpretation course as being convenient, accessible and flexible. She regarded the most beneficial factor of the course was that after she had completed it, she has been able to go back to the online modules to revise and reflect on her practice. Overall, she stated that the course had enabled her to extend her knowledge and increase her skill level.

Susan

Susan is a registered nurse who preferred not to disclose her age. She has been working in cardiology services for more than one year. However, she has been a nurse for nine years. Susan did the online ECG interpretation course, describing her experience as good in that she was able to revise, redo, and relisten to the course when she needed clarification of certain points, although she admitted that the online course was somewhat vague. She found that the course was, for her, like just staring at a picture without being able to work out the relation between the ECG and descriptions of it. She suggested refining the online learning material by adding a highlighting element to emphasise the most important aspects of ECG description. She stated that the flexibility and accessibility of the course helped and promoted her overall understanding. However, she stated she was not certain that the course shapes her knowledge and competencies to an advanced level. At the same time, she was annoyed because she had to dedicate her own time to do the course. She stressed that the learning process is an individual matter; different people acquire and retain their learning in different ways.

Discussion

With data in phenomenological research being voluminous and rich, it is essential for the researcher to be immersed in the data to gain a deep understanding of the topic of interest. To gain hermeneutic understanding, the researcher's pre-understanding and conversational data play a vital role [27]. The researcher must be aware of his/her own pre-understanding, starting with recognising their own fusion of horizons before understanding the phenomena in a new perspective beyond their horizons [23, 28]. The researcher in this study had a pre-understanding of the nature of skills required in a cardiac setting and methods to achieve competency. It was argued by Gadamer [29] that understanding can be achieved through

dialogue between the researcher, participants and the text. Furthermore, he stated that conversation allows the researcher to be immersed in the data. In fact, 'human science' meanings in an individual's experience are multidimensional [23]. Indicating that understanding is sought through analysis of conversation, either interview or text, to uncover meanings of the individual's lived experience. Consequently, as seeking understanding through interpretation is the aim of the phenomenological hermeneutic approach, the researcher needs to adopt a systematic method to analyse participant dialogue and text.

The Gadamerian hermeneutic cycle offered a framework that emphasised how researchers must consider the whole, with part of the text providing unity of meanings within [30]. van Manen [23] used the notion of phenomenological reflection to refer the researcher in search of meaning within the text. He argued that meanings of the lived experience gained from participants within the text are structural in meanings and themes. Furthermore, he emphasised that gaining insight into the essence of the phenomena requires clarifying and interpretation of structures of the meanings found in the lived experience. Thus, this research adopted an analytical framework for analysis, using participant interviews to achieve the purpose of the Gadamerian hermeneutic cycle and van Manen's perspectives of life experience research.

van Manen [23] defined thematic analysis as 'the process of recovering the theme or themes that are embodied and dramatized in the evolving meanings imagery of the work'. In this research, thematic analysis was applied as it was the most suitable approach to reveal the essence of the phenomena within experiences of registered nurses using online CPD to advance their skills. van Manen [23] stressed that human science meanings can only be communicated through textual and structural meanings, as well as thematic forms. It is argued that the notion of theme usually refers to mathematical application of the frequency of selected terms in the transcript [23]. At the same time, van Manen [23] found that themes in participant transcripts inform an experiential structure revealing the lived experience. Thus, for phenomenological hermeneutic research thematic analysis provides an insightful approach to discover and disclose meaning structures in the lived experience [23]. For this research, interview transcripts were analysed using Braun and Clarke [31] six step thematic analysis approach to discover repeated patterns that reflect the meanings of lived experiences.

Braun and Clarke [31] introduced a six-step thematic analysis model for qualitative research (**Figure.1**). This model provides the researcher with an outline for analysis by constantly moving back and forth across rich and detailed data. This process enhances understanding through interpretation according to the Gadamerian hermeneutic circle, which involves moving from the whole to part, and part to the whole of the data [30]. The six steps of the thematic analysis model are described in this section.

In Phase One (Familiarising with the data), it was imperative that the researcher was familiar with the depth and richness of collected data. Braun and Clarke [31] stated that immersion in collected data is vital during this stage to construct initial analytical thoughts. Also, van Manen's methodological structure recommended being very close to the lived experience in order to grasp participant verbal and non-verbal clues as way of exploring the most of their lived experiences [30]. The researcher used the following strategies to become familiar with the data. First, interviews were transcribed manually. Transcription is considered an interpretive act and a perfect way to immerse oneself within the data because it helps create initial meanings [31]. Second, the researcher listened to each interview while

checking compatibility with the transcript. Third, the researcher read and re-read transcripts and highlighted essential ideas before the coding process (Table 1).

Speaker	Data set
IR	So what would you like to tell me about your experience? How did you find the online CPD course created for cardiac nursing, such as ECG interpretation course?
IE	It is actually very enlightening and educational because there are things that we do not discuss or there is no time to discussing or reading in our own books that are insitu our ward because that ward is just too busy so it really.. ahh, doing it in your own time at home. I don't do on line education here because there is no time. So I do it in my own time at home. And do my online competencies there and also do my own reading because there is stuff in the online because there is stuff in the online competences at time that I don't know about that I need to read on it more, googling it or get some journals that pertains that kind of topic or discussion. [sic] yes (Mary: P3,L11-21)

Table 1: Example of the identification of the main ideas from data set of Marys' interview transcript. Note: (IR: interviewer, IE: interviewee, P3: participant number, L: line number)

Repeated transcript reading helped develop main ideas, recognise shared thoughts, meanings and patterns, and identify potential themes [31]. Furthermore, it was evident during this stage that some of the researcher's pre-assumptions regarding the phenomena were revealed in certain aspects of nurses' lived experiences. In addition, audio recordings and a

reflective diary were utilised to reveal non-verbal clues of participants, adding depth and transparency to data analysis. The final step involved writing a summary for each transcript containing the main ideas (appendix 1).

Appendix 1: Sample interview summary

Lucy Interview Summary

Lucy is a registered nurse who is working in a cardiology ward for one and a half years. Lucy joined that cardiology service because of her interest in becoming a cardiology nurse. She normally updates her knowledge using both text books and online resources. However, she mostly uses online resources because they contain more recent and updated information.

Regarding her experience of using the online ECG interpretation course, she stated that the online learning was good for the following reasons: first, the new course was short compared with the older version with the old version. Second, the information is accessible even after she has finished the course. She further explained that the flexibility and the accessibility of the online course allowed her to go back to the content and revise whenever she came across a new type of rhythm on the ward. It made reflective learning easy and accessible for her. Also, she could repeat the quizzes that are within the course as a way to refresh her information.

On the other hand, she found the disadvantage of doing the short course was that a lot of information has to be taught in a short period. However, she expressed her gladness for being able to attend the weekly session (which was optional due to the limited seats). She found that helped to keep her up-to-date with her learning. After each session, as she stated, she revised what was discussed in the classroom and set up the question that she wanted further explanation for. She emphasised that she liked the course with the classroom session embedded within it for the previously mentioned reasons. At the same time, she assumed that this is her personal preference in learning and other nurses may prefer to accomplish it just through the online components.

Lucy was doing the online component at home only because of the busy ward and lack of time for any type of self-learning. However, doing it at home in her own time was not an issue for her as she had to dedicate time to do it as she stated. She emphasised that her social life was not affected, and she managed her time very well. She also mentioned that she has very good computer skills and the course was easy to access and go through.

As she completed the course a few weeks before the interview, she found herself not yet ready to transfer this information to the student and newly graduated nurses. Instead, she stated that she is at that stage where she is going back to the course content and relating it to practice and discussing it with the senior nurses. She stated that she will be happy to help others interpret the ECG after she has become competent.

She concluded the interview by stating that she enjoyed doing the course as it was not as stressful as was described by her colleagues who did the classroom based course. She said that the course has advanced her knowledge indeed, and, as long as the course content is accessible, her knowledge and skills will be improved as she will always have the chance to relate it to her practice and the cases on the ward.

In the phase two (Gathering codes), codes refer to a meaningful short segment of data, derived from the data set, related to the topic of interest [31]. The data set refers to collected data used for analysis; for example, the part of the interview transcript that represents ideas related to the phenomenological question [31]. In this stage, initial codes were identified and generated from the data set [31]. As human lived experience includes multiple layers that cannot be revealed through one direct approach [23], the researcher applied ways to capture main codes related to the phenomena under investigation. First, the researcher conducted this phase manually to be more immersed in the data. Second, the researcher applied the selective or highlighted approach suggested by van Manen [23] to extract substantial aspects from participant transcripts. In this approach, the researcher read the text several times and identified phrases pertaining to the phenomena or described experience. In this study, the latent data drive coding approach was undertaken to seek codes that represent participants’ own words. Braun and Clarke [31] argued that latent coding allows for the meaning of the phenomenon to be interpreted at an early stage of analysis.

The researcher used the following steps to conduct the coding process:

1. Data containing the main ideas as highlighted in phase one were extracted from participant transcripts and named as data set.
2. The data set for each participant was converted to table format, adding two columns for codes and subthemes. Each table was labelled with the participant’s pseudonym.
3. All data sets were re-read, with significant features transferred to the code column.
4. All codes were reviewed. Codes that carried similar meaningful patterns were clustered under one code. Later, codes that present clusters of primarily identified codes were considered as subthemes (**Table 2**).

The researcher conducted ongoing reflection on the participant experience through the transcripts. Further refinement and clustering of codes and subthemes as appropriate, resulting in further subthemes and themes emerging. This step is comprehensively explained in next section. At the end of this phase, the researcher identified a long list of initial codes detected in the data set (**Table 2**).

	Data set	Initial codes	Preliminary subthemes
IE	It is actually very enlightening and educational because there are things that we are not discuss in or no time with discussing or reading in our own books that are insitu our ward because that ward is just too busy so it really... ahh doing it in your own time at home. I don't do on line education here because there is no time. So I do it in my own time at home. And do my online competencies there and also do my own reading because there is stuff in the online because there is stuff in the online competences at time that I don't know about that I need to read on it more, googling it or get some journals that pertains that kind of topic or discussion. (Mary: P3,L11-21)	<ul style="list-style-type: none"> • Enlightening and educational • no time with discussing or reading in our own books because the ward is busy. • No time to do online education in the time. • I do it in my own time at home • there is stuff in the online competences at time that I don't know about that I need to read on it more, googling it or get some journals that pertains that kind of topic 	<ul style="list-style-type: none"> • Advantage of online CPD • commitment • challenges • self-directed learning

Table 2. Example of the identification of the initial codes from data set of Marys’ interview transcript. Note: (IR: interviewer, IE: interviewee, P3: participant number, L: line number)

In phase three (search for themes), we focused on analysing data within a broader context by investigating emerging themes from the subthemes that emerged from initial codes as extracted from participant experience descriptions [31]. It is worth mentioning at this point that the act of merging the basic patterns to identify a common theme is a hermeneutic process. In other words, the researcher sought to capture coherence from the participants’ described experiences and achieve a fusion of horizons [32].

The Gadamerian philosophical concept of the fusion of horizons influenced the researcher when searching for themes from initial codes. During this stage, firstly, the researcher identified sub-themes with similar

meanings or were interrelated under one broad theme. For example, the subthemes ‘self-directed learning’ and ‘advantage of online CPD’ built an initial theme called ‘knowledge advancement’. This approach facilitated clearer understanding of the meanings of lived experiences. In a phenomenological hermeneutic approach, it is essential that the reader clarifies the cognitive movement during data analysis(23). The researcher utilised the same table that was initially created in phase two, categorising the codes by theme (Table 2). Second, each theme, including the sub-theme, codes, and relevant data extracts, was transferred to a new Microsoft Word file as a preparatory step for the next phase (**appendix 2**).

Appendix 2: Development graph of the six themes**Theme one: convenience**

Participants	Extracted data (response)	Open code	Sub themes
Brenda	that you can access it during working hours also at home, I think it is handy to have it up there	✓ Good because its accessible.	Accessibility
	having it there on line resources to go back and look at and reflect on I find it really handy	✓ Available recourse to reflect on.	Can be revised
	if we had time to actually sit down and do the education in the ward and that's where we struggle here. We don't have a lot of time to do that. We are lucky to get to lunch!	✓ Accessible but no time to use it at work.	Accessibility
	Generally increase your knowledge then and there because you can look it up and the information is there.	✓ Increase the knowledge there and then.	Can be revised
Lucy	good in a way like you can rewind. I can rewind, re do it and re listen to it.	✓ Can be rewind, re do it and re listen to it.	Can be revised
	Yes you can re watch it and reflect back and they got something like print out, like a work book, but it's not really a work book but it like a work sheet	✓ re watch it and reflect back. ✓ printable material. ✓ work book is accessible.	Can be revised
Susan	But most of it, I have to do it at home	✓ Accessible at home.	Accessibility
Ann	good now that we still we have that information that we can still go back over because it was a lot of information in that short period of time but it was good to go back over it .	✓ Still have the information which allow to go over it. ✓ Can go over the information again.	Can be revised
	I can go back over the quizzes or go back over the text information and the slide show that they showed and all that information and goes from there, and also when looking at ECG in the ward.	✓ Reflective practice by going back over the course materials.	Can be revised
	It is flexible course	✓ Flexible.	flexibility
Mary	I don't do on line education here because there is no time. So I do it in my own time at home	✓ Accessible at work and home. ✓ Accessible at work but can't perform it because busy ward.	Accessibility
	you do it and rehash what you have learned from before.	✓ Can be revised.	
	Annoys a lot of us because, as you said , it takes time out of your own family and your own family setting, but the fact is here, it is a very busy ward, as you have worked here, you just don't have time to do, and if you do you cannot focus, because the bell is ringing, someone is asking.	✓ Negative feature of the accessibility of the course. ✓ The nature of busy ward hinder the privilege of courses accessibility.	Accessibility
	I'll need to do it at night, on my night off, until the midnight and I'll do the online competencies.	✓ the course is done according to the nurse's most convenient time.	flexibility

Theme two: Commitment

Participant	Extracted data (response)	Open code	Sub themes
Brenda	The course was intense and I knew that I had to dedicate the entire 10 – 12 weeks or whatever it was to it	✓ The intensity of the course result in commitment to learning.	Obligation
	So I put it in the hours so I know that I'll learn	✓ Allocated time to learn.	Obligation
	I can put other thing on hold in my personal life to make sure that it has been done and succeeded in it because I knew that was what I wanted to do	✓ Balance between personal life and dedication to learn.	Balance between personal life and dedication to learn
Ann	but I think that was good to keeps you on track and knowing that you have to do it and there is a certificate at the end when you going to finish this course , I think it was good to have that bit of commitment to keep on track and actually get it done.	✓ Commitment to accomplish the course.	Obligation
Mary	I do it in my own time at home.	✓ Allocate time to do the course from her own time.	Balance between personal life and dedication to learn
	I do my online competencies there and also I do my own reading because there is stuff in the online competences at time that I don't know about! that I need to read on it more, googling it or get some journals that pertains that kind of topic or discussion.	✓ Seek for information for further understanding. ✓ Self initiative to seek for information.	Self-directed learning

Theme three: Mentorship

Participant	Extracted data (response)	Open code	Sub themes
Brenda	You normally need other peoples' opinions, views, you must missed something yourself that other pick up	✓ Others opinions facilitate understanding.	Sharing of knowledge
Lucy	I have really done that with the ECG strips, that sort of thing, because I can't work out what's going wrong. So yeah, it is good to have that sort of group and discussing the strips, that sort of thing, but I haven't really discussed too much.	✓ Group mentoring help to figure out what's wrong in the ECG.	Mentoring others
	I can see the good points of it.....you do the course and you come out of it into the practice a lot more.	✓ Relevant to practice. ✓ The outcome of the course can be explained to others.	Mentoring others
Susan	But it does help to have senior staff on the ward as mentors, sort of clarifying things for you.	✓ The necessity to have someone to clarify things with.	senior nurses are source of knowledge
	I just need some time to ask who has done it? and know what they are talking about, just make things a bit clearer .so yeah you need a mentor.	✓ Mentorship is provided by the nurses who did the course.	Sharing of knowledge
	And then you have to actually ask and then learn.	✓ Learning through asking other senior nurse.	senior nurses are source of knowledge

Ann	I am still going back over the information. so I have gone through it with senior staff to check that I am competent and confident with what I actually looking at.	✓ The need for senior nurse to verify the correct interpretation.	senior nurses are source of knowledge
Mary	And then there are things that you don't know about. when you come to work, you ask someone.	✓ Approaching others people to explain the doubts.	senior nurses are source of knowledge
	I explain because of what I have learned	✓ Upgrade the knowledge to teach others.	Mentoring others
	Sometimes actually I ask our doctors , especially the doctors that I know that are very approachable and they can explain to me.	✓ Doctors can be mentors.	Sharing of knowledge

Themes four: Individual learning style

Participant	Extracted data (response)	Open code	Sub themes
Brenda	I understand it's all on line now and I don't know if I can cope with that?	✓ Can't cope with online learning.	challenges
	I can't just read something and generally just absorb it	✓ The information is not totally absorbed through online learning.	
	I am learner of person to person discussing things I need to discuss with other people	✓ Prefer face to face learning.	Learning preferences
	I think there should be some class room time	✓ Course embedded with classroom sessions.	Learning preferences
	I suppose for the people who prefer face to face, yes provide the online things, and then provide opportunity if you would like to come along to this session dedicated every few weeks	✓ Provide online learning but considering others' learning preferences	Learning preferences
	maybe just offer a little bit of face time rather than just purely online and email me questions.	✓ Offer face to face interaction along with the online course.	Learning preferences
	it is so individual; you need to know how you learn as to whether or not you are able to learn or succeed in it. I was quite lucky I learn how I learn. so I was able to adopt those skills (sic).	<ul style="list-style-type: none"> ✓ Learning is individual. ✓ The learner should know how to learn. ✓ Being familiar with the personal way of leaning facilitate skills adaptation. 	Learning preferences
Lucy	Usually when you are in a lecture or something. So you can see exactly what they trying to show you.	✓ Visual aid like a lecture aid to understand what the lecturer is trying to say.	Learning preferences
	Its little bit vague when you are missing something and then watching just the picture.	<ul style="list-style-type: none"> ✓ Online is vague. ✓ Confusing as just watching a picture and may miss something. 	Learning through the screen
	I don't mind the screen	✓ Screen is not an issue of understanding.	Learning through the screen

	use a third type or mode of education: video type live lectures, face to face interaction, and online modules	✓ Multiple resources for learning must be facilitate further learning.	Learning preferences
	like I re -watch the lectures and reflect that through, that sort of thing.	✓ Reflective learning through re-watching the online course.	Learning through the screen
	I do have like another couple of text books that I use to understand what they are trying to say.	✓ Use text book to gain further understanding.	Learning preferences
	everyone goes to how they learn	✓ Everyone has unique way of leaning.	challenges
Susan	I am just doing it online	✓ Online learning.	Learning through the screen
	so it's a lot of back and forth , trying to make sense of everything, I don't know if it's just me?	✓ Cannot understand the content directly.	challenges
	I think it's pretty hard to do the full course online. and come out of it and totally understand everything!	✓ hard to do the full course online. ✓ Hard to fully understand it through online.	challenges Learning through the screen
	it just me to ask question if I need clarification with the rhythm.	✓ Prefer to asking questions for further clarification.	Learning preferences
	you have to connect your theory to practice as well.	✓ connect your theory to practice.	Learning preferences
Ann	I probably enjoy the face to face contact as well as doing the online, I think it's good to step away from the class room and go home and review	✓ enjoy the face to face contact and the online learning.	Learning preferences
Mary	I think both needs to be done, hand in hand, like lectures, like in our regular educational times in the ward, sometimes once or twice every fortnight and the online they go together, they go hand in hand, it help us both.	✓ Online and ward based education interrelate together in advancing the knowledge.	Learning through the screen

Theme five: Application to Practice

Participant	Extracted data (response)	Open code	Subthemes
Brenda	The course was intense	✓ course was intense.	Intensity
Susan	relevant for working here	✓ Relevant for work.	Relevant to practice
	there is a lot involved in the course and you just go from one topic to another	✓ Rich and informative course.	Intensity
	you definitely know what you are looking for, so yeah you definitely know what you are looking for after doing this module and doing the course	✓ Knowing what looking for in the rhythms after doing the course.	First step
	So it gives you sort of the ABCD management for a patient	✓ give sort of the ABCD management for a patient.	First step

	I say okay I know what's happening here and then the next step is like how do we treat these rhythms?	✓ Can recognize the rhythm but not the treatment.	Essential knowledge
	that stuff is more what you are doing in the ward	✓ The course relates to the essential practices in the ward.	First step
	And then you have actually ask and then learn	✓ Further learning driven from asking.	Relevant to practice
	lot to learn in the ward itself.	✓ A lot to be learned in the ward.	Relevant to practice
Mary	(Where you able to apply knowledge you gained from the course into practice?) With excitement: she explained? Yes yes , especially with people going in to AF , they don't understand, all what they explain to me : "my heart is skipping out, ,your body getting too fast and I am getting tired " so I explain to them why that is happing " this is common for someone with heart operation , 3 out of 10 patients will get them, normally day 2, day 3, day 4 will go to this kind of rhythm and we can fix it chemically, and what we can do is keep you calm , you don't worry , we are here for you, it will revert in the normal rhythm, we will give you something relief if you are in pain, I can hold your hand" reassurance.	✓ Promoted the knowledge regarding patient education.	Relevant to practice
	the online courses gave me some appreciation of what I have learned theoretically and practical stuff, so it enable me to discuss, and make decisions when I need to apply what I learned into my work in the ward.	<ul style="list-style-type: none"> ✓ Appreciate the theoretical and practical input. ✓ Developed decision making skills. ✓ Developed the motivation to discuss the cases. 	Essential knowledge
Ann	a lot of information in that short period of time	✓ The content is rich to be taught in shout time.	Intensity
Lucy	when they are talking quit in-depth about the heart	✓ The course contain in depth knowledge.	Intensity
	I couldn't tell you something fantastic about different rhythms. So now it is sort of easy to recognise the basic rhythms	✓ Easily can recognise the basic rhythms.	First step

Theme six: Satisfaction with the online course

Participants	Data extracts	Initial code	Subtheme
Brenda	It's good to have it there and actually I am planning on re-doing the whole course online	✓ Good tool, plan to redo again.	Satisfied
	So it's good that it's there, you can go to it immediately. Generally increase your knowledge then and there because you can look it up and the information is there.	✓ Increase the knowledge because it is available all the time.	Satisfied

Mary	the online courses gave me some appreciation of what I have learned theoretically and practical stuff, so it enabled me to discuss, and make decisions when I need to apply what I learned into my work in the ward.	<ul style="list-style-type: none"> ✓ Appreciate the theoretical and practical input. ✓ Developed decision making skills. 	Satisfied
	it encouraged me to do some more research about things	<ul style="list-style-type: none"> ✓ Promote self-directed learning. 	Satisfied
	so it is for me a valuable tool	<ul style="list-style-type: none"> ✓ valuable tool. 	Satisfied
Lucy	I wouldn't say I am really competent , I don't have strong history in cardiac , but I'll be able to say , okay so that's is definitely is AF, it's like the basic sort of thing	<ul style="list-style-type: none"> ✓ Learn basic things. ✓ Online learning did not achieve competency. 	unsatisfied
Susan	I couldn't tell you something fantastic about different rhythms. Only can recognise the basic rhythms	<ul style="list-style-type: none"> ✓ Easily can recognise the basic rhythms. ✓ Can't elaborate in different rhythms. ✓ Anything is learned is knowledge advancement. 	Satisfied Unsatisfied Satisfied
	it is beneficial but still more to learn.	<ul style="list-style-type: none"> ✓ Beneficial but more to learn. 	Satisfied
Ann	on line learning was good	<ul style="list-style-type: none"> ✓ Good. 	Satisfied

In phase four (review of themes), we aim to achieve meaningful coherence within the data of each theme and to clearly distinguish between different themes [31]. As in the previous phase, the researcher separated each theme from its sub-themes, codes, and related data extracts to facilitate the reviewing process, which was done by applying two steps. It was necessary to acknowledge that the data set represents part of transcribed interviews, whereas the data extract is the significant part of the data. In the first step, the researcher read and re-read codes, sub-themes and main themes against data extracts to ensure that all presented data was coherent and related. As a result, some of the initial themes were refined or collapsed, and other new themes emerged. Once all themes were revised by applying this step, the researcher created a hierarchical diagram for each theme which is described in the next phase.

In accordance with Braun and Clarke [31], step two was applied once the researcher was satisfied with the concordance between themes, their codes and data extracts. Through this step, the researcher ensured that developed themes reflected description of the whole data set, in addition to determining emergence of new codes. Thus, achieving validity and accurate results in meanings embodied in participants' lived experience descriptions [31]. In other words, this step enhanced applicability of data which helped achieve study rigour. Therefore, re-reading was a main task in this step. Considered as a hermeneutic circle task, it allowed the researcher to move back and forth within the text to achieve the interpretive purpose by ensuring that all the data fit together and represented the meanings of participants' experiences (**Figure 1**).

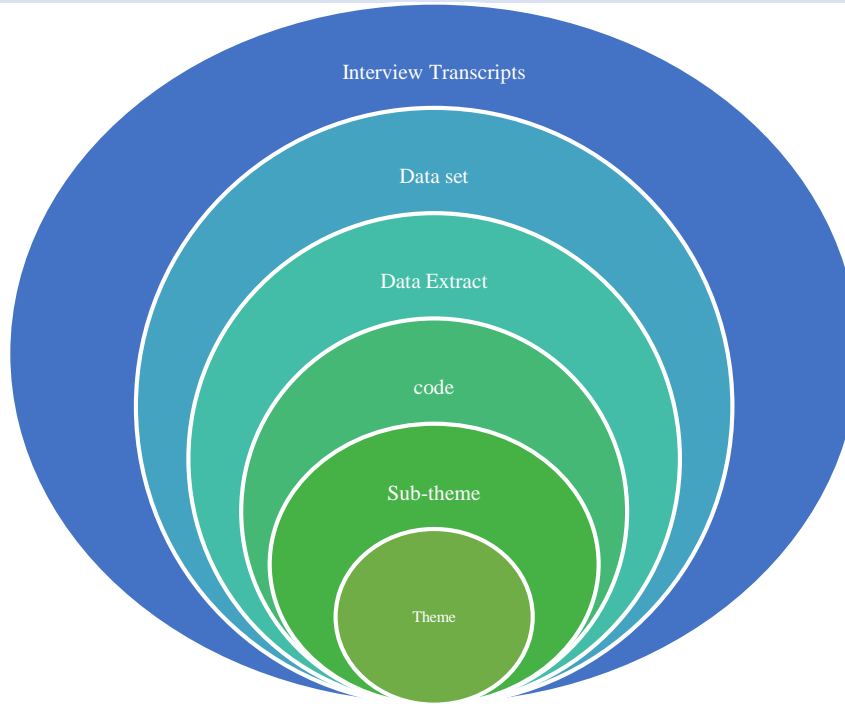


Figure 1: Application of the hermeneutic cycle adopted from (Austgard 2012)

Phase five: Defining the themes

In phase five (defining the themes), we aim to identify the essence of the phenomena in participants’ lived experiences by refining and defining identified themes [31]. Here, the researcher was required to present each theme with a detailed analysis to articulate how all data sets fitted together under one theme. In other words, the researcher wrote a story that explained the relationship between themes, relevant data, and the phenomenological inquiry [31].

Transcript codification resulted in a set of shared meaning codes, labelled as subthemes. The researcher managed to identify unity and

commonalities in meaning from subthemes under six majors’ themes. The major themes were convenience, commitment, mentorship, individual learning styles, application to practice, and satisfaction with the online course.

In theme one (convenience), the development of this theme was determined from comments made by the registered nurses (RNs) regarding features of the online courses. As evidenced by coding transcripts from participant interviews, the RNs experienced the online CPD course with features that did not restrict usage to a time or a place. The features that categorised as subthemes were: can be revised, accessibility and flexibility (**Figure 2**).

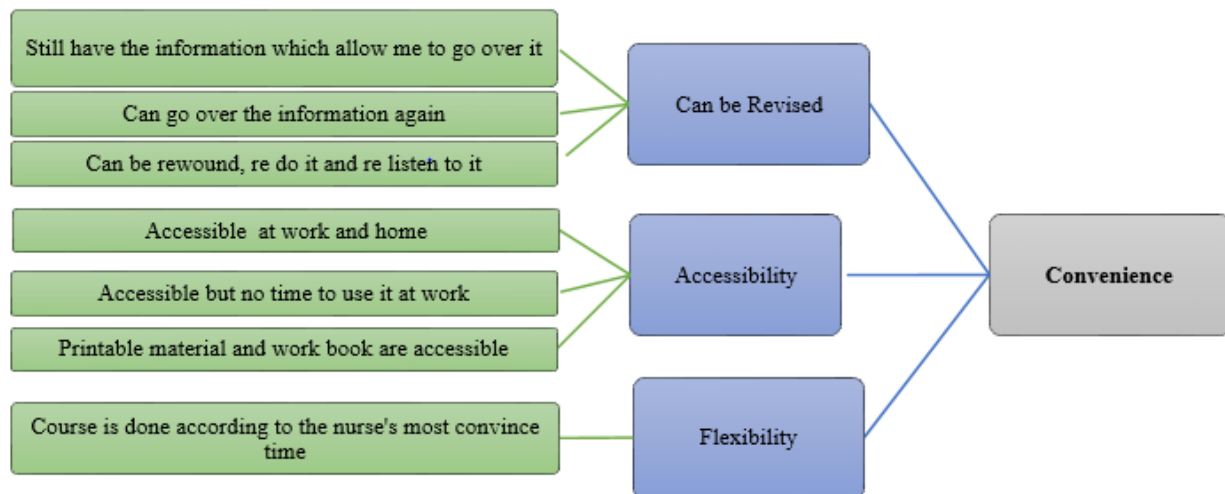


Figure 2: Thematic map of convenience

The second major theme (commitment), which represented the experience of RNs, was being responsible for their own learning. These RNs were committed to pass the course. It was evident through the codification

process that self-directed learning, balance between personal life and professional growth, and obligation exemplified these RNs experience of being committed to the course (Figure 3).

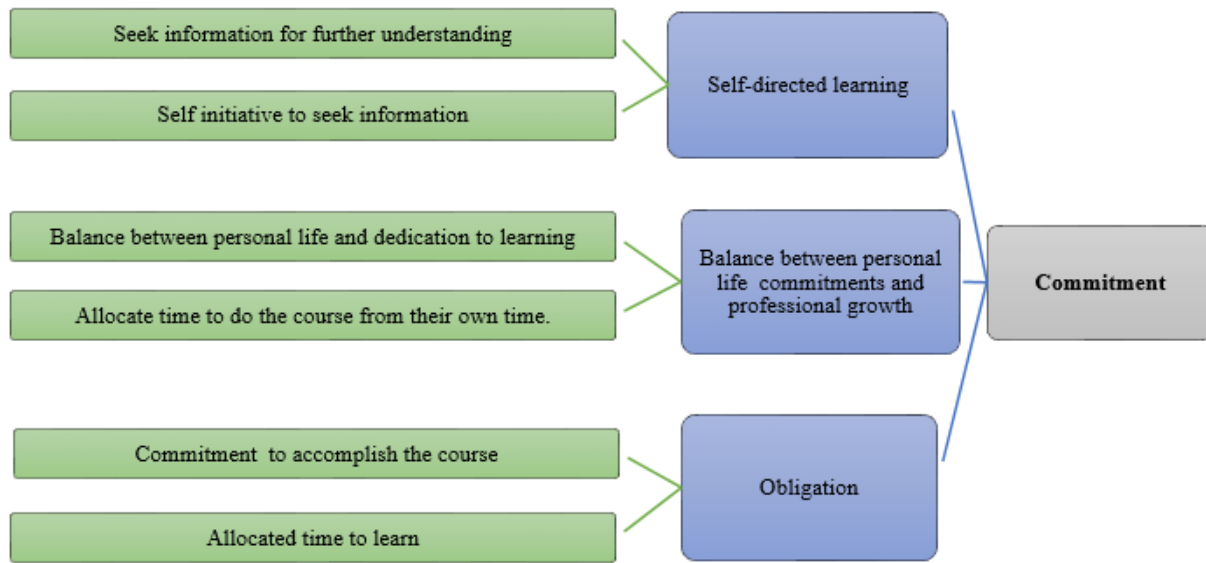


Figure 3: Thematic map of commitment

The third major theme (mentorship) presented analysis of the experience of the RNs in using the online course as a means for two-way mentorship. The RNs attributed their experience to the explanation and clarification of course content. The coding process evidenced that RNs valued three

major aspects of their experience that related to mentorship: knowledge sharing, mentoring others and senior nurses as sources of knowledge (Figure 4).

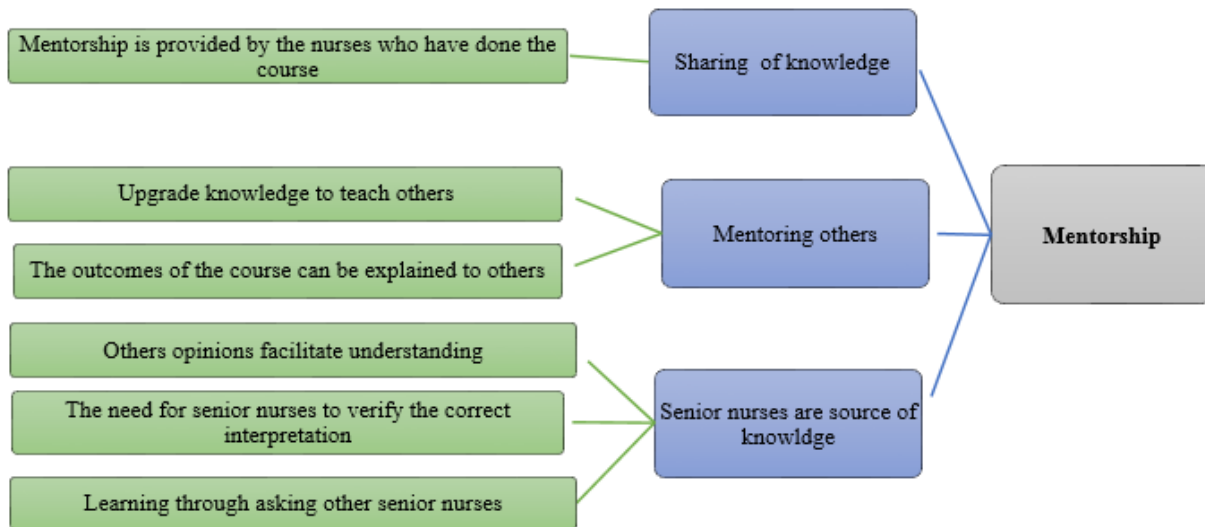


Figure 4: Thematic map of mentorship

The fourth major theme (individual learning style) presented aspects of the study related to learning styles of RNs. The development of this theme emerged from comments made by RNs about their own learning styles

and coping strategies when using the online course. The codification process revealed three subthemes: learning preferences, screen-based learning, and challenges (Figure 5).

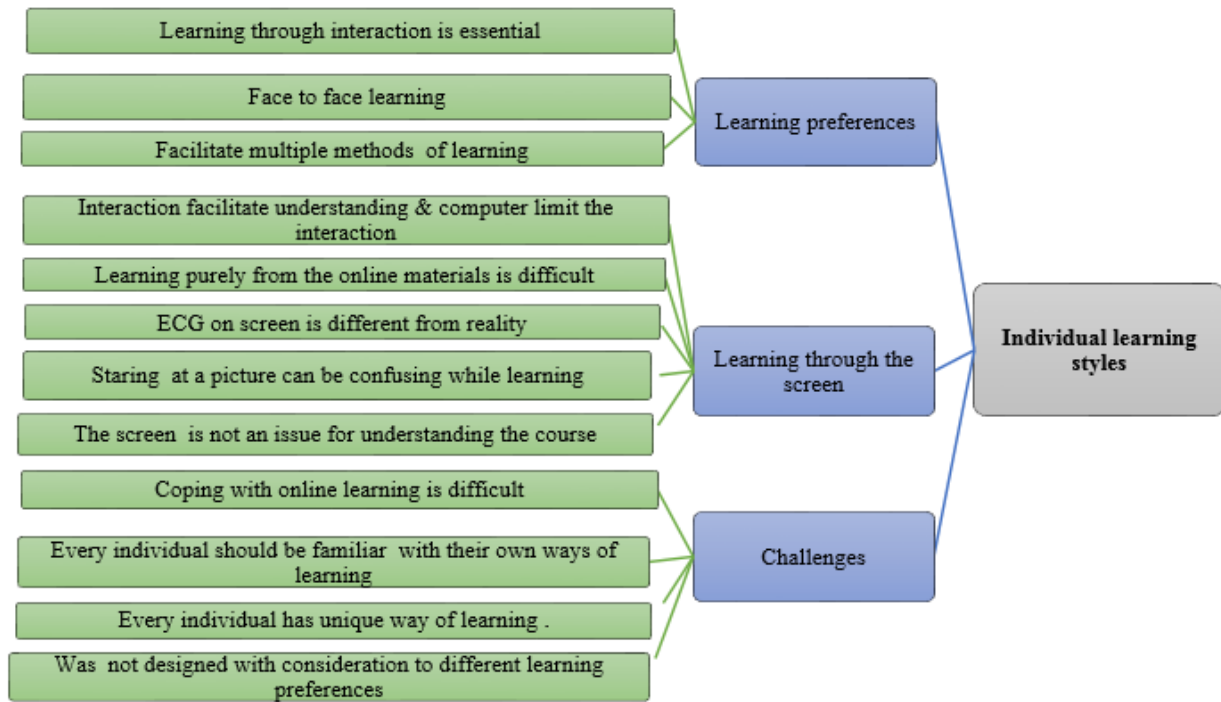


Figure 5: thematic map of individual learning style

The fifth major theme (application to practice) arose from comments made by RNs regarding the relationship between knowledge and skills related to clinical practice and online CPD courses. The coding process

categorised the experience of RNs into four major areas: intensity, relevant to practice, essential knowledge, and first step (Figure 6).

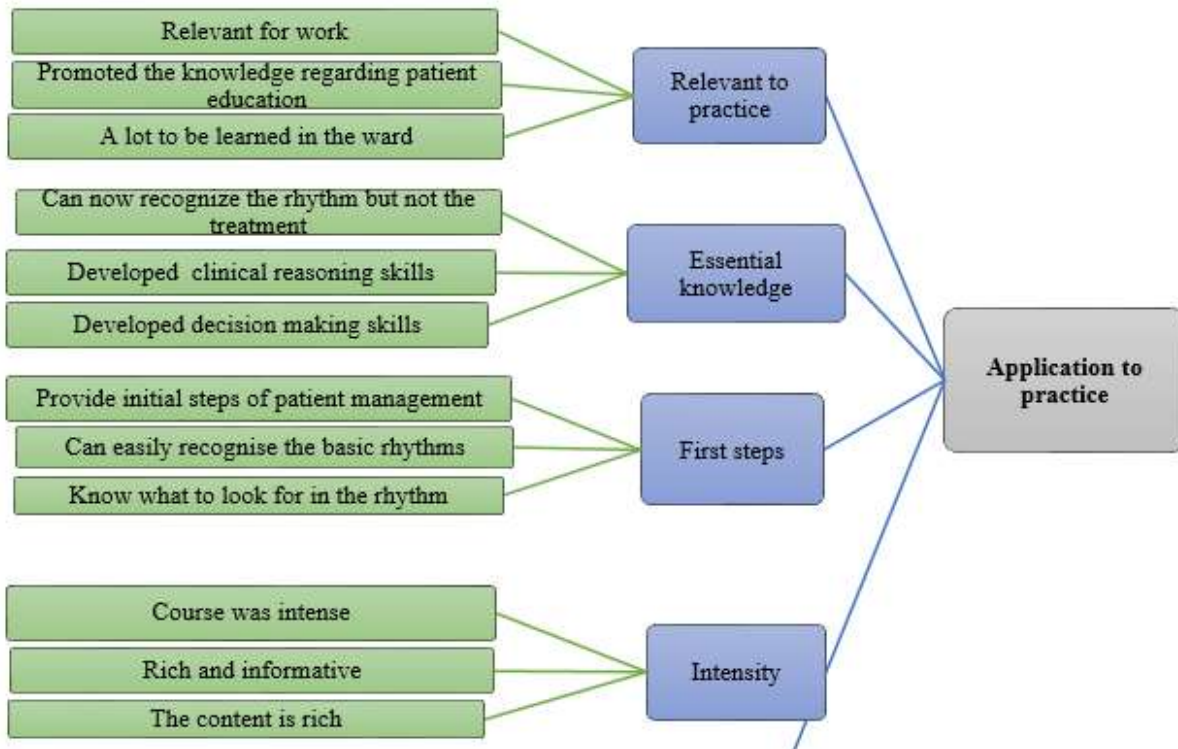


Figure 6: Thematic map of application to practice

The final theme (satisfaction with online CPD course) was identified from comments made by RNs regarding their satisfaction with the course.

Coding their interview transcripts revealed two major subthemes: satisfied and unsatisfied (**Figure 7**).

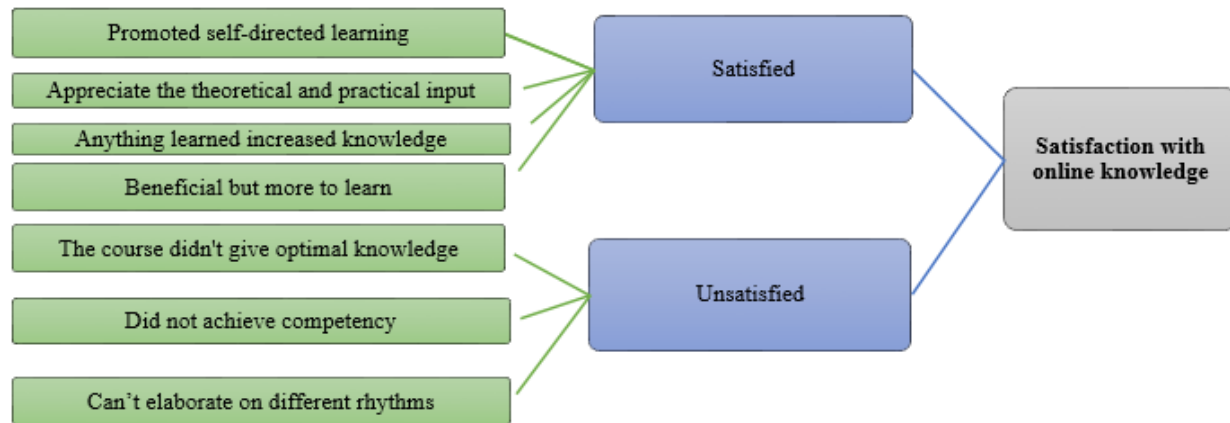


Figure 7: Thematic map of satisfaction with online CPD course

Phase six is the reporting phase. This phase included final analysis and a written report for each theme. The report should provide logical and cohesive presentation of evidence from participant data extracts that support their prevalence to the theme development. This phase is represented in the interpretative chapter, rather than as a report.

Conclusion

There were six main themes embedded in the lived experiences of the RNs working in cardiac services and using the online CPD course to advance themselves knowledge and skills. The thematic data analysis served the purpose of the phenomenological hermeneutic study by revealing and understanding the essence of the RNs. The Gadamerian hermeneutic concept and van Manen's research methodological perspective were integrated for the process of data analysis, allowing the researcher to better understand the phenomena under investigation.

Declarations Section:

Disclosure of potential conflicts of interest:

The study was approved by the Research Ethics Committee at the Royal Adelaide Hospital (approval number HREC/16/RAH/168). The study groups certify that the study was performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments ethical standards. The research was conducted according to the NHMRC National Statement on Ethical Conduct in Human Research, 2007.

Consent for publication: All authors have agreed to the publication and to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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