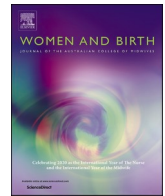




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Students as researchers: An example of high-level participation of undergraduate midwifery students as co-investigators in research[☆]

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ABSTRACT

Background: There is a shift in focus of the curricula of undergraduate midwifery research-education - from research content to the research process, and the student from being an observer to a participant.

Aim and Methods: To explore an example of how to involve midwifery students as co-investigators in research. This paper discusses the experiences of an educational research project that adopted the highest level of student autonomy in research, involving six Bachelor of Midwifery final-year students participating as co-investigators in qualitative research focusing on women's lived experiences of traumatic childbirth. The experiences are supported by the parameters of research-education and learning, and are discussed in the context of the dimensions of framing undergraduate research: Motivation, Inclusivity, Content, Originality, Setting, Collaboration, Focus and Audience

Discussion: Crucial for this educational research project is the recognition of the motivation, interests, (experiential) knowledge and real-world experiences of students. It starts with listening to the questions, thoughts and ideas that students bring, recognising and respecting the content and importance of their work and what is important and meaningful to them, while facilitating a student-led learning process. Collaboration between students and students and supervisors needs to be formally facilitated and supported, as this contributes to qualitative products for curricular and extra-curricular products. An academic infrastructure is necessary to support extra-curricular activities.

Conclusion: To embed research adequately and effectively in the curriculum, a pedagogical approach, institutional learning and student-centred teaching strategies and practices, including high impact practices to mainstream undergraduate research and enquiry, are crucial.

STATEMENT OF SIGNIFICANCE

Problem or issue

Undergraduate midwifery students need to be empowered to construct their own or new knowledge of research and enquiry if they are to graduate with the intended skills. They need opportunities to engage in research at early stages of their learning. Curricula for midwifery education need pedagogically underpinned methods and strategies.

What is already known

Students will benefit from opportunities to actively participate in

undergraduate research and contribute to real-world research and enquiry. Universities benefit from increased satisfaction ratings among students who actively participate in research. Engaging undergraduate midwifery students in research is crucial to ensure that students graduate with the generic attributes that will help them to make sense of the complexities of midwifery and the world.

What this paper adds

High-level participation of undergraduate midwifery students as co-investigators in research can be achieved through integrating research-led teaching, research-tutored and research-oriented teaching in the undergraduate midwifery curriculum, preparing students for their research project as part of a student-centred

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research-based education and high-impact practices.

1. Introduction

With the increased emphasis on evidenced-based midwifery practice, it is important that midwifery students acquire research skills, gain direct knowledge, and understand the research process, and how that builds the evidence base for midwifery practice - with the aim of improving care for childbearing women and their families as qualified midwives [1,2]. To keep up with the (global) speed of change, technology, the health and societal complexity of society, cultural diversity, and with constantly changing knowledge, many higher education institutions have responded with embedding coherent research-based learning curricula emphasising student engagement, participation, and enquiry [3,4].

There are four different ways of framing research in the curriculum of midwifery education, distinguishing between *research-led* teaching, *research-tutored*, *research-oriented*, and *research-based* teaching (see Box 1) [5–9]. The different teaching approaches reflect a shift in focus from research content to the research process and a shift in the role of the student, from being an observer to a participant - suggesting a progressive acquisition of skills [4,10]. Walkington [9] advocates for the *students as researchers'* pedagogical approach to be embedded in the curricula of undergraduate research-education. This pedagogy supports undergraduate students in their engagement with research, with the aim of furthering their knowledge and understanding and, contributing to the broader knowledge base of their discipline (e.g., midwifery) where students develop the ability to frame the enquiry. There are five different levels of student participation in higher education research to effectively employ the pedagogy (see Box 2) – the levels fitting the continuum of the extent of student autonomy in research [9]. The pedagogy can serve as a vehicle for high impact practices in undergraduate education, such as for example, curricular seminars based on students' research and connecting individual's or societal existentialism, themes and values with research and research design [11].

The aim of this paper is to discuss a final-year educational research project in the Bachelor of Science (BSc) Midwifery curriculum of Rotterdam University of Applied Sciences, Netherlands, based on the observations and experiences of the processes and outcomes of the project. The educational research project discussed in this paper, involved six fourth/final year midwifery students, an Associate Professor of Midwifery (YK), and a midwifery lecturer (SV) (15 February 2016–4 July 2016). The discussion paper is supported by the parameters of research-education and learning [4] in the context of the research-based teaching approach and the highest level of student autonomy according to the students as researchers' pedagogical approach [9]. The discussion

is constructed according to the dimensions of framing the undergraduate research context: Motivation, Inclusivity, Content, Originality, Setting, Collaboration, Focus and Audience (see Box 3) [4,9,10,12]. These dimensions represent the contextual structure and strategies of how to integrate undergraduate research and enquiry into the curriculum [10].

2. Discussion

2.1. Motivation

The primary goal of the final-year educational research project is that students acquire first-hand experience of operationalising fundamental aspects of the research process by working with established researchers, being involved at the highest level of undergraduate student participation in research [9]. The outcomes of the project are presented in Box 3. Students were provided with a choice of research topics from the Associate Professor of Midwifery. The research topics were selected based on practice-based relevance, on institutional/ faculty interests (research domains) and/ or on current (inter)national trends and developments in midwifery [9] but were not strictly defined or articulated - allowing the shift from initially curriculum and research domain (faculty)-initiated to student-initiated research [4,9,10,12]. In this case, the topic of research *traumatic childbirth* was chosen and presented within the woman-centred care domain of the midwifery programme at the university [13]. The rationale for choosing the topic was the societal interest in disrespectful birth [14,15]. According to Dutch guidelines on research ethics, ethical approval was not required [16]. However, an amendment for ongoing woman-centred care research was submitted (Scientific Research Ethics Committee Rotterdam, protocol reference no. T2016–72). The committee reviewed the amended protocol and waived further ethical procedures because they did not regard the topic of study as invasive [16].

2.2. Research teaching approaches

In preparation for the project, students complete two research modules in the first and second year of the midwifery programme, allowing a progressive way to support student development in research [9]. The research modules “Quantitative research skills for evidence-based midwifery care” (year 1) and “Qualitative research skills for evidence-based midwifery care” (year 2) are based on the following three curriculum teaching approaches: learning about research, using current midwifery-related research (*research-led teaching*), engaging in research discussions (*research-tutored teaching*) and developing research skills and techniques (*research-orientated teaching*) [5–8]. The quantitative research module is completed with the (formative) modified Fresno-test [17]. The qualitative module is concluded with a summative assessment, demonstrating understanding of the qualitative research

Box 1

Framing research in the midwifery curriculum.

Teaching Approach	Focus
<i>Research-led teaching</i>	Informing students about current and ongoing research in midwifery, including research papers from staff teaching the students
<i>Research-tutored teaching</i>	Engaging students in critical discussions and appraisal of published midwifery-related research.
<i>Research-orientated teaching</i>	Developing students' knowledge of research methodologies and the required skills and techniques that are often used in midwifery research
<i>Research-based teaching</i>	Students frame and undertake their own enquiries and explore existing knowledge - conclusively building new knowledge in the domain of study (e.g., midwifery)

Box 2

Levels of student participation in undergraduate research.

Level 1	Lectures on research theory
Level 2	Joining tutor-directed research
Level 3	Participation of students in pre-determined research in terms of development of methodology and reframing and determining course of action
Level 4	Unsupervised independent research without feedback
Level 5	Student-determined research with feedback

Box 3

Dimensions of framing the undergraduate research context.

Motivation	Research initiatives can be faculty or student-initiated
Inclusivity	Students can be selected based on their research abilities, level of education (e.g., Honours), grades, competition, and motivation, offering selective or equal opportunities of support
Content	The scope of the research can be discipline based, inter- or multidisciplinary based
Originality	The content of the research can add to existing scientific knowledge or can include new knowledge for the individual student, for education and/or practice
Setting	Undergraduate midwifery research can be curricular, co-curricular and extra-curricular. Questions to be addressed can also be defined by external organisations
Collaboration	Research can be performed by individual and groups of students, a research group or through academic and inter- or multidisciplinary professional fellowships that involve students
Focus	The output of the research can be student and process-centred (i.e., student development) and/or outcome and product-centred (i.e., products for assessment, publication, presentation, etc)
Audience	The research can be presented to peers, educators, (multidisciplinary) professionals and non-professionals

process and methods. [Box 4](#).

2.3. Dimensions of framing the undergraduate research context

2.3.1. Motivation and inclusivity

Students were invited to express their interest in co-investigating the topic, explaining why they were interested in the topic and if they had any ideas how to methodologically embark on the topic. Six students wrote personal stories about their clinical encounters that had affected them when witnessing and/or sharing the experiences of women who

reported their birth as a traumatic experience or had been involved in care leading to trauma. All students were selected based on their motivation. The Associate Professor selected the students, who had no knowledge of the first and second year formal and summative assessment results, thus academic achievement played no role in the selection. Additionally, the students' methodological ideas did not weigh in the selection. Instead of selecting one or two students, all six students were selected, extending the research experience to multiple students - enhancing inclusivity [10]. To achieve the outcomes outlined in [Box 3](#), the students had allocated time divided over the third and fourth

Box 4

Research outcomes on completion of the final-year research project.

On completion students should be able to:

- (1) Demonstrate the necessary knowledge and skills of reflection and critical analysis to engage in research-based activities
 - (2) Collect and interpret relevant data from the field of expertise with the aim to form an opinion, based on weighing relevant social, scientific and ethical aspects
 - (3) Show a professional approach to her/his profession
 - (4) Show competencies for drawing up and sustaining arguments and for problem-solving in the field of expertise
 - (5) Communicate information, ideas and solutions to an audience consisting of specialist and/or non-specialists
 - (6) Demonstrate evidence-based woman-centred care according to the concept definition embedded in the undergraduate midwifery curriculum
-

semester of the final year of study to search the literature, formulate the research aims/questions, determine the appropriate methodology, collect and analyse the data and to write a research report. Allocated time in the curriculum allowed inclusiveness by offering all students the same timeframe and mechanisms of support [10].

2.3.2. Content and originality

The six students searched the literature about prevalence rate, causes, and consequences of traumatic childbirth. From the literature it became clear that traumatic childbirth is an individual and subjective experience, implying that defining traumatic birth can only be done by the woman herself [18]. The students therefore added *experience* to the topic of study, shifting the topic of study to *women's traumatic childbirth experiences*. Furthermore, the students learned from the literature that the quality of the provider (e.g., midwife) interaction played a causal role in the occurrence of women's traumatic childbirth experiences [18], thus (their) practice would benefit from recommendations how to optimise care to prevent traumatic childbirth experiences. The students decided to focus on: the individual lived experiences, intrapersonal emotions, and the intrapartum care needs of women who self-identified the birth as a traumatic experience. When defining the eligibility criteria for the study, the students decided to include women who self-identified their labour and birth as a psychological distressing experience with an enduring emotional effect [19]. The following research aims were articulated:

- I. To explore the woman's intrapersonal emotions during and after the birth that affect her perception of the traumatic childbirth event.
- II. To investigate the patterns of actions and interaction between the individual woman and her situation/environment in which the traumatic birth experience took place, allowing to form a theory on the intrapartum care needs of women with traumatic childbirth experiences.

After exploring the literature, the students reflected on their own thoughts about the topic of study to increase awareness of their potential biases. The students discussed the position of women in society and the social expectation and the public opinion that childbirth is supposed to be a joyous event. The students noted the stigma around women who voice the opposite and observed that women are often subjected to power imbalances in maternity care services. This made the students decide to utilise a feminist perspective. This course of action allowed high impact practice as the students connected societal existential values with their research [11]. The research became multidisciplinary in content as the information to be gathered was relevant for professionals from maternity as well as for (perinatal) mental health services. By incorporating the feminist approach, the multidisciplinary content of the research was connected to sociology. Based on the literature search, revision and reflection, a qualitative research design seemed to be the obvious choice, building on acquired skills in the second year of study [4,8–10,12].

The students thus decided on a qualitative research design. Interviews were conducted to explore the woman's interpersonal emotions and to investigate the patterns of actions and interaction between the individual woman and her situation/environment [20,21]. The research was original for the students themselves, it added to their research knowledge, to the existing knowledge base of traumatic childbirth in the midwifery domain and to a multidisciplinary perspective of traumatic childbirth [4,9,10,12] - as a woman's traumatic childbirth experience exists within underlying values and opinions of various domains in healthcare and social sciences [22].

2.3.3. Setting and collaboration

Woman-centred care is the philosophy underpinning the midwifery pre-registration curriculum of the Rotterdam University of Applied Sciences. Based on research-led teaching in the previous years of study,

the students were familiar with the concept of woman-centred care [13]. The students decided to frame their inquiry using the lens of the women-centred care definition [23]. The enquiry posed and pursued by the students therefore served a co-curricular purpose [5–8] as the students aimed to develop a deeper understanding of the experiential knowledge phenomenon, an element of the woman-centred care definition [23]. Women's experiential knowledge is being regarded as legitimate, authoritative and of dual and equal importance next to the midwife's professional knowledge and expertise [23]. The research project set the stage for woman-centred care research and honoured the emerging understanding of women's experiential knowledge to potentially being added to the midwifery curriculum for research-led teaching [5–8].

The students proposed the research questions, framed their own enquiry and carried out the research. All of this was done in consultation with the (co)supervisors at a level determined by the students' needs and their timetable, allowing the students to gain ongoing feedback. The Associate Professor supervised the project and, in collaboration with the students, set the project's milestones and met with the students throughout the research period to discuss the research and the students' learning process and development. The lecturer co-supervised the project and facilitated five scheduled four-hour meetings to support research progress. These meetings contained other student researchers (with a maximum group size of eight students), all participating in various woman-centred care related research, facilitating to share research experiences, woman-centred care knowledge and peer-feedback – being very much student-led. If necessary, the Associate Professor joined the meetings but only when being invited by the students. The Associate Professor and lecturer had regular contact to discuss the progress of the research project and issues that required action. There were 10 h per student assigned for supervision and a total of 20 h for co-supervision of a group of students.

The students and (co)supervisor discussed the sensitive aspect of the topic and the students' (in)experience as interviewees and as a group it was decided to consult a certified mental health counsellor with expertise in support and treatment of women with traumatic childbirth experiences. The counsellor (DK †) was added to the research group and trained the students in how to conduct an interactive and free flow conversation with emphasis on non-verbal reactions, empathy and neutral responses to the women's experiences and managing emotional safety of participants with preventing the interview to become a therapeutic conversation. Despite the committee waiving the invasive character of the study, the research group felt responsible to offer a backup system for the support of participants who might experience the interview as distressing. The certified counsellor was available for the participants to offer professional help if needed. The quantity and the content of collaboration allowed to develop a collaborative relationship between the students, between the students and supervisor, co-supervisor, and counsellor [9].

The six students embarking on the one topic of study, organised themselves by pairing up in three groups of two students and divided recruitment of participants in three groups: primiparous and multiparous women (at least 18 years of age who had given birth no longer than three years ago at a minimum gestational age of 37 weeks) with an exclusively midwife-led (home)birth, an exclusively obstetrician-led (hospital)birth and women being referred during labour from midwife-led to obstetrician-led care (intrapartum transfer of care). These are the three mainstream intrapartum care pathways in Dutch maternity services [24]. Women who had experienced foetal or neonatal mortality were excluded. The students used purposive sampling, including snowballing, through a Dutch Birth Movement Facebook group which resulted in 76 responses. From this, 36 women were included based on eligibility criteria and availability of the women in the short period of data collection (12 March – 15 May 2016). In the recruitment message, women were informed that the study was part of midwifery education. The 36 women were equally divided between the

three student-pairs. Each student-pair conducted 12 face-to-face interviews, utilizing alternating roles as interviewer and observer, allowing to learn and experience both roles. Firstly, women were invited to tell and reconstruct their personal story (research aim I). Secondly, women were asked the three following questions: (research aim II) Can you please tell us about: (1) your experiences of the care you received during the birth; (2) whether there were any care aspects lacking or which could have been different and, if so, what; (3) are there any aspects that could optimise or improve (future) intrapartum care management. The interviews lasted between 45 and 90 min. The student-pairs transcribed the interview verbatim after each interview. The dataset provided sufficient information to address both research aims. However, because there were six weeks left to analyse the data and write the research reports (see Focus and Audience), the students and the supervisors thought that addressing both research aims in terms of analysis and writing up would be unrealistic in the time that was left. Therefore, it was decided to focus on research aim II for the purpose of the project. The three student-pairs analysed their 'own' 12 interviews. They utilised a process of open coding, creating categories and abstraction – according to the constant comparison analysis method [25]. The student-pairs initially labelled and categorised the data of their 'own' transcripts, clustering preliminary categories. At each of the five co-supervisor facilitated group meetings, the student pairs presented, compared, and discussed their codes and categories until completion of the study. This way, each meeting the dataset increased in size by adding transcripts, while the students clustered similar categories and defined preliminary themes as the analysis continued. At the end, the six students individually read all the 36 transcripts to determine the meaning of the findings and the essence of women's experiences and established consensus on the final categories and core themes [20,25]. During the data collection and analysis phase, collaboration was crucial as pairs and as a group [9].

2.3.4. Focus and audience

The work was carried out for individual formal assessment. The focus of the formative assessment was product-centred, requiring a written research report (Bachelor thesis) and an oral (poster) presentation for a campus audience of peers (student midwives) and lecturers [4,12]. Summative assessment was performed by the supervisor, focusing on the individual learning process of the student, including the student's response to feedback, the student's role as researcher, role in the research group, collaboration with peers and (co)supervisors, and relevance for the woman-centred care domain [4,12]. Furthermore, the students had abstracted knowledge from their research that was extremely important and meaningful to them. The students expressed the wish to widen the focus of output and to communicate and disseminate their knowledge in alternative ways than a scholarly research report and to different audiences - showing methods of high impact practice [11,26,27]. The students wanted to translate their research findings in a scientific way through publication, for their work to be read by a broader range of healthcare professionals, and to expose their authenticity [27,28] and continued to be involved in extra-curricular post-project activities; an additional analysis and dissemination of the findings. Based on the research aims, two separate papers were written and published [20,21]. The analysis addressing research aim I was performed after the research period, following the same collaborative procedure [21]. The Associate Professor wrote the concept papers which were revised based on several rounds of feedback from the students and the counsellor. Additionally, the research team discussed the idea to emphasize the feminist perspective by using a form of art that could effectively help to translate the findings on women speaking up about concerns to direct a critical dialogue towards traumatic childbirth experiences and to highlight features of these lived experiences otherwise ignored in maternity services, midwifery practice and/or education [29]. In co-construction with the industry, animation with an embedded script was chosen to deliver the health information

resource because of its ability to permit the exploration of difficult issues in a non-threatening form during its creation and because animation is a product that can enable dissemination via various modes of delivery [30]. Both publications were used to develop the script and storyboard and to select images, a voice-over, music, and sound effects. Feedback from various stakeholders (women, midwives, obstetrician, psychologist, midwifery students, lecturers) was received via informal workshops (separate for women and professionals) and individual conversations during which oral feedback was collected. Most of the stakeholders perceived that the animation had tackled the issue of power in maternity services, but even more the rawness, intensity, and desolation of a woman's lived experience of traumatic childbirth. So far, the animation has predominantly been used for midwifery education and midwives' continuous professional development purposes and has been presented at (inter)national midwifery conferences. This way, a research-based teaching product is being used for curricular and extracurricular research-led teaching, showing high impact practice as well as students have gained experience in alternative ways of dissemination [9,11].

2.4. Lessons learned

For the students, the final piece of research was an intense journey and (co)supervising the research demanded a substantial time investment. Whether this is worth the efforts requires evaluation among students and staff. However, it is known that students who actively participate in undergraduate research report increased intellectual curiosity, high personal interest, enhancement of research and communication skills and functioning as a team member. They know how to support an argument, tolerate ambiguity, see themselves as stakeholders in the worlds of research and over and above their research experiences continue long beyond the student experience and graduation [2,3,10,27, 31–35].

As supervisor and co-supervisor, we observed the development of students from relying on external references, authority, and defined competencies to evolving awareness of own values and awareness of multiple perspectives in developing an internal belief system and sense of capacity and engaging in authentic relationships [36]. As a research education team, we have learned a lot since the project and adapted the curriculum in terms of the timeline of the project. Currently, the students have allocated classical time and support during the first and second semester of year four to search the literature, revise their knowhow of research designs and methodologies and to frame their concept ideas about their research aims and questions. The hours of the supervisor and co-supervisor have shifted accordingly. This period bridges the time between choosing the topic of research at the end of the third year and the actual start of the research in the third trimester of the fourth year, leaving more time for the research activities.

3. Conclusion

This paper provides a unique insight into an educational project involving undergraduate midwifery students as co-investigators in research at the highest level of student autonomy, representing the principles of research-based teaching and completing the research cycle with dissemination being an integral part of student activity. The students acquired first-hand experience of operationalising fundamental aspects of the research process by working with established researchers, being involved at the highest level of undergraduate student participation in research, including communicating their knowledge to multiple contexts and audiences. The project supported the students to meet the outcomes of the BSc Midwifery pre-registration curriculum required for graduation.

The dimensions Content, Collaboration, Focus and Audience predominantly described the students' research skill development while Motivation and Inclusivity mostly applied to the supervisor's role. The dimension Collaboration aligned with the students as researchers'

pedagogy level 5, emphasising relationships in education. The Dimension Motivation showed how the students connected and pursued their own individual interests and taking ownership of their learning process.

Not only did the project fit the woman-centred care philosophy that underpinned the midwifery curriculum of the midwifery programme, but the educational research project also fitted the framework, the methodological and pedagogical principles for a student-centred curriculum design, learning and teaching strategies and a student-centred learning environment.

Conflict of interest

None declared.

The educational initiative described in the paper was carried out at Rotterdam University of Applied Sciences. At the time of the initiative both authors were employed here.

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In memoriam of Diana Koster (1965–2016).

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.wombi.2022.11.004](https://doi.org/10.1016/j.wombi.2022.11.004).

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