Approaching the concept of research in the 5-year teacher education programme in design, art, and crafts

An analysis of the Norwegian national curriculum regulations

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In 1976, a master's programme in art and design education was established at two pedagogical institutions in Norway. The programme can be seen as the first step in developing field-specific research education for professional teachers in the field. The programme was implemented without parallels at the universities and thus lacked an established research tradition on which to rely. The master's programme has retrospectively been described as transdisciplinary in nature. This mode of knowledge production encourages disciplinary crossing and the study of reality from multiple angles. By 2023, at the latest, a 5-year teacher education programme for practical and aesthetic subjects, including design, art, and crafts, will be implemented in Norway. In this article, the concept of research, as it appears in the Norwegian national curriculum regulations for the upcoming programme, is analysed through a summative content analysis. The analysis addresses the questions of what characterises the concept of research in the national curriculum regulations and how the concept of research corresponds to the legacy of the original master's programme established in 1976. Among the findings is that both profession-oriented research and artistic development work are acknowledged as research in the curriculum regulations, which agrees with both original ideas of the master's in art and design education and transdisciplinary knowledge production. Teamwork as part of research appears to be an area for further development. This analysis suggests drawing on transdisciplinarity as well as experiences from 'educational practice' in teacher education in the further development of the concept of research.

Keywords: transdisciplinarity, research, national curriculum regulations, teacher education, design, art and crafts

Introduction

Recently, there have been major changes in higher education in Norway. In 2017, the teacher education programmes for primary and lower secondary schools expanded into two 5-year programmes, including a master's degree. The academic ambition was to better prepare students to seek and use research-based knowledge (Norwegian Ministry of Education and Research, 2018). In 2020, the teacher education programmes in practical and aesthetic subjects for years 1–13, including design, art, and crafts, were decided to be extended, correspondently. The 5-year programme is to be implemented in 2023 at the latest (Ministry of Education and Research, 2020). Due to the adopted changes, teacher education in practical and aesthetic subjects extends from three to five years and includes a main subject area, such as design, art, and crafts, alongside 30–60 credits in one or two other school subjects. The combination of subject(s) affects the educational level at which students are qualified for teaching. Educational practice will be incorporated throughout the programme. The programme is to be rooted in research and experienced-based knowledge and offer coherence between subjects, professional subjects, and practice (Ministry of Education and Research, 2020, p. 1). This article aims to explore the characteristics of the concept of research in the programme.

A master's programme in art and design education has been offered since 1976 at two pedagogical institutions in Norway, one located in Oslo and the other at Notodden, Telemark (Fauske, 2014). Until the present, the master's programme has been offered to professional teachers in the field. An important component of the original master's programme was the inclusion of both the student's creative work as well as different theoretical perspectives. The master's thesis should include both theory and creative work, and it should be conducted following accepted research methods and science theory (Fauske, 2013, 2014; Lærerutdanningsrådet, 1976). The original master's programme was implemented without parallels in the university system (Norgesnettrådet, 2001). Consequently, there were no established research traditions to rely on in shaping and framing the programme's content and educational practices. The programme can be seen as the first step in developing field-specific research education for professional teachers in the field.

The master's programme has, from its origin, encompassed an inside perspective on the subject and has emphasised studies *through* the practise of making rather than only theoretical studies *about* the subject (Melbye, 1988). In the first explorative years, the teachers and supervisors actively pushed the boundaries of research and education by developing the programme and teaching from scratch (Fauske, 2014). The original master's programme can be described as an educational innovation since there was no equivalent established master's programme then (Fauske, 2013; Melbye, 1994). Retrospectively, the master's programme has been described as transdisciplinary at its core; however, it is stressed that this concept was applied without full self-awareness (Dunin-Woyseth, 2008; Fure, 2007, 2010). According to Bernstein (2015), transdisciplinarity represents a change in thinking about both research and education since it encourages disciplinary crossing and the study of reality through multiple levels and angles. Transdisciplinarity "(…) has gained recognition as a mode of research applied to real world problems that need not only be understood in new ways but also demand practical solutions" (Bernstein, 2015, p. 11). The assumptions drawn from Dunin-Woyseth (2008) and Fure (2007, 2010) invite further discussion and reflection on the upcoming master's programme in design, art, and crafts.

Research question

In preparing for the implementation of the 5-year programme in practical and aesthetical subjects, limited to the main subject design, art, and crafts, a main concern has been whether the original ideas refined in the master's in art and design education, introduced in 1976, can be found in the National Curriculum Regulations, to be implemented. This concern forms the basis of this study. This study takes inspiration from Dunin–Woyseth (2008) and Fure (2007, 2010) and analyses the upcoming curriculum regulations. The intention is to explore the concept of research as it is applied in the regulations. This analysis addresses the following question: What characterises the concept of research in the national curriculum regulations? Consequently, how does the concept of research correspond to the legacy of the master's programme established in 1976?

Documents and records must be interpreted within a cultural context. Coffey (2014) described both writers and readers of texts as social actors. Their knowledge may often be tacit. According to Coffey (2014), both the production and reading of text concern 'making sense' and can be regarded as a socially organised activity and an active process. Documentary realities are thereby built, consolidated, and confirmed. Due to this stance, understanding documents is likely to presuppose cultural competency. This implies that reading and analysing the national curriculum regulations will be read differently by a reader from the field of music compared to one from the field of design, art, and crafts. Although practical and aesthetic subjects have many similarities, history, educational ideas, and beliefs differ. This analysis is conducted from the viewpoint of the subject field—design, art, and crafts.

Current issues in transdisciplinarity: Implications for design, art, and crafts

There is no universal definition of transdisciplinarity. Conversely, varying interpretations of this concept have been drawn (Mullally et al., 2016). However, the crossing of disciplines and academic silos is emphasised, including the concepts' relevance to real-world problems. The anchorage in real-world problems implies working in both academic and non-academic settings, and the participants' involvement outside of academia is on equal premises as the researcher (Bernstein, 2014, p. 250). The complexity of real-world problems necessitated the transcending of both disciplinary thinking and interdisciplinarity.

> Transdisciplinarity, in other words, results from a growing recognition among scientists, scholars, and educators of the limitations and distorted priorities of disciplinary thinking. By applying the term "transdisciplinarity" rather than ordinary "interdisciplinarity" to the study of knowledge, I am suggesting that such work transcends disciplinarity by challenging disciplinarity itself and the entire framework of disciplinarian thinking, assembling a new approach from the ground up using the materials of earlier discipline-based studies (Bernstein, 2014, p. 251).

Transdisciplinarity as a concept is retraceable to the 1970s (Bernstein, 2015; Mullally et al., 2016). Bernstein (2015) provided a comprehensive review of the concept from the 70s to the present and drew on various sources. In elaborating on current issues in transdisciplinary research, Bernstein emphasised research that includes participants from outside the research community and "[…] strives to transcend the traditional dichotomy between objective and subjective viewpoints" (Bernstein, 2015, p. 7). Another issue in current transdisciplinary work is the focus on engaged, socially responsible science. Bernstein highlighted studies on sustainability as an example. This type of research engages researchers, government, industry, and citizens and brings research and education together through common aims. Such aims concern ethics and the importance of changing behaviour. Bernstein referred to this type of work as "wicked problems" because it comprises complex problems that are intractable and defying complete definitions. Wicked problems cannot be solved through existing methods. "These are pressing problems, even crises, reaching in multiple domains or dimensions and involving not just academic disciplines and the interplay among them but also practitioners seeking solutions in the real world outside the academy" (Bernstein, 2015, p. 8). Although transdisciplinary work can be regarded as teamwork, Bernstein stressed that this type of work is not essential when engaging in transdisciplinary research. The work of the 'solo transdisciplinarian' is also a recognised approach. However, the 'solo transdisciplinarian' must fuse knowledge from different disciplines and engage with stakeholders in the process.

Finally, Bernstein connects current transdisciplinarity issues to the need to think laterally, imaginatively, and creatively about solutions to specific problems, including synergising different factors requiring consideration in the process (Bernstein, 2015, p. 9). Hence, input from the arts and humanities is described as insights that contribute to transcending both traditional research and education.

Master's programme in art and design education regarding transdisciplinarity

The master's degree in art and design education, established in 1976, has emerged from different modes of creative and educational practice. The programme has retrospectively been described as transdisciplinary at its core; however, the term seems to be applied without full self-awareness (Dunin-Woyseth, 2008; Fure, 2007, 2010). Dunin-Woyseth, a former leader of the doctoral programme at the Oslo School of Architecture and Design (AHO), has emphasised severally the relationship between the making professions and transdisciplinarity (Dunin-Woyseth & Nielsen, 2004; Dunin-Woyseth & Nilsson, 2012). In 1995, the doctoral programme at AHO was opened for candidates other than architects, including educators in art and design. Dunin-Woyseth contributed strongly to this change and enabled educators to undertake an organised doctoral programme rooted in the making profession (Nielsen, 2018). Fure, a former docent at the master's programme in art and design education at

Notodden, has been discussing art, theory, research, and education (Fure, 1989, 1994). Both Dunin-Woyseth and Fure identified similarities between international research changes in the 1990s and early 2000s and the fundamental ideas shaping the master's programme in art and design as early as the 1970s.

Upon its implementation, the master's programme was among the first in Norway to include creative work (Fauske, 2014). National regulations demanded that this programme be levelized as established master's at the universities, that is, to answer to the scope and hold the same quality standards (Lærerutdanningsrådet, 1968, p. 19). The master's programme covered educational perspectives, theory of science, research methods, aesthetical theory and practical aesthetical work/creative work (Lærerutdanningsrådet, 1976). Lacking a research tradition rooted in creative practice, the master's programme relied on theory from different established disciplines, such as pedagogy and art history (Nielsen, 2018). Retrospectively, this can be described as the crossing of different disciplines and practices derived from different viewpoints and angles, and in line with transdisciplinarity.

In the article *More Than a Quarter of a Century. The Doctoral Programme at Oslo School of Architecture and Design: Notes on the Development of Education Since 1981,* Dunin-Woyseth (2008) reflected on the development of research education at AHO. This includes changes made in 1995, one of which was the acceptance of art and design educators into the programme. This article presents eight volumes of Research Magazine published at AHO. Dunin-Woyseth analysed each volume and addressed these as milestones explaining historical facts and activities related to the development of the doctoral programme. Number 6 of the magazine had the title *Discussing Transdisciplinarity: Making Professions and the New Mode of Knowledge Production* and was devoted to Modes 1 and 2 of knowledge production. In distinguishing between Modes 1 and 2, the article relies on the descriptions and definitions offered in the book *The New Production of Knowledge. The Dynamics of Science and Research in Contemporary Societies* (Gibbons et al., 1994). In the article, transdisciplinarity is acknowledged as an aspect of Mode 2. Dunin-Woyseth (2008) relied on Fure (2007) as she addressed the master's programme in art and design education and referred to this as transdisciplinary in its core.

Fure (2007, 2010) offered a comprehensive discussion of the master's programme in art and design education, elaborated through the concept of transdisciplinarity. In approaching transdisciplinarity, Fure, like Dunin-Woyseth, relied on Gibbons et al. (1994). In what follows, the similarities between the concept of transdisciplinarity and the original master's programme in art and design education are addressed. This presentation draws primarily on the work of Fure (2007, 2010).

The fusion of theory, creative work, and research

In 1994, Gibbons et al. defined transdisciplinarity as "Knowledge which emerges from a particular *context of application* with its own distinct theoretical structures, research methods and modes of practice but which may not be locatable on the prevailing disciplinary map" (Gibbons et al., 1994, p. 168). The main point in Fure's (2007, 2010) reasoning in regard of the mater's is the integration of theory and practice in the students master's theses. The students are to include both educational aspects, relevant theoretical studies, and the practical aesthetical/creative work in their work. The choices regarding theory and practice depend on the research question. Following Gibbons, the context of the application determines which research methods, modes of practice, and theories the student will rely on. Due to the complexity of the master's thesis, the students cannot lean on one single theoretical concept or methodological approach. According to Fure, the master's in art and design education is characterised by combining different aspects in one whole rather than treating them as separate blocks.

> The Master's studies at Notodden and Oslo (…) were established in 1976. These subject areas were highly successful in breaking through the academic wall by integrating theoretical studies into the artistic/creative studies, not by placing them one category as a block besides the other, but by establishing them as an integrated whole (Fure, 2010, p. 12).

What Fure labels as an integration of different theoretical and artistic/creative studies resembles Gibbons' description of transdisciplinarity, emphasising that knowledge emerges from a particular context of application driven by its own theoretical structures, research methods and modes of practice (Gibbons et al., 1994, p. 168). The context of application is also apparent in Gibbons' definition of Mode 2.

> Knowledge production carried out in the context of application and marked by its, *transdisciplinarity; heterogeneity;* organizational heterarchy and transience; social accountability and *reflexivity*; and quality control which emphasises context- and use-dependence. Results from the parallel expansion of knowledge producers and users in society (Gibbons et al.,1994, p. 167).

In Mode 2, Fure (2007, 2010) identified a concept that accepts and encourages knowledge production *through* the fusion of different theoretical concepts and the inclusion of creative work. This concept legitimises the approaches and characteristics of the master's in art and design education since its origin in the 70s. The master's in art and design education have exclusively been offered to professional teachers in the field. In assumption, this implies that the master's students are familiar with issues that are rooted in practice, including both educational practice and creative/artistic practice. Hence, students draw on experiences, discussions, and specific cases that have emerged through workshops in teacher training when conducting educational practice as part of training or working as a professional teacher. In approaching an explicit research question, the master students tend to utilise experiences from the real world of teaching, but without a clear answer, that is, "wicked problems". This type of problem is not individual per se and may give insights into authentic problems shared by the community of art and design education.

Gibbons et al. (1994) emphasised context- and use-dependence. Context- and use-dependence may involve the context in which the student is conducting his or her master's project, such as working actively at the studio or engaging in field studies at schools. However, Gibbons may also indicate explicit cooperation between different stakeholders, similar to the description of teamwork in transdisciplinary projects (Bernstein, 2015). This aspect of transdisciplinary work is not apparent in the master's thesis, as described by Fure (2007, 2010), since the specific students mentioned in Fure's text are working individually on their separate projects. Since Fure elaborated on integration as essential in the student's work, this can be regarded as the "solo-transdisciplinarian", where the fusion of knowledge from different disciplines in the work of one researcher is a hallmark (Bernstein, 2015).

Following Gibbons, Fure (2007, 2010) emphasised Mode 2 as a heterogeneous and flat structure of research, and by this opposed Mode 1 illustrated by a pyramid. In Mode 2, Fure identified a concept that accepts and encourages knowledge production through the integration and fusion of different theoretical concepts and creative work. Both Dunin-Woyseth (2008) and Fure (2007, 2010) recognised the master's in art and design education to be in line with Mode 2 and transdisciplinary approaches to knowledge production. They also emphasised the art and design education community's lack of self-awareness on this matter. Knowing that the community of art and design education was not able to attend organised research education until 1995 (Nielsen, 2018), this insight may explain why such awareness was absent. However, the inclusion of creative work in research has expanded in recent years, both in Norway and internationally. The doctoral programme at AHO embraced this new academic stance in 2004 when accepting creative practice as an argumentation and not solely as an illustration in the work of doctoral candidates (Dunin-Woyseth, 2008, p. 12). This implies that, although the art and design education community was lacking proper arenas to listen, discuss, and influence debates on research at the time, the genuine character of the master's programme was unique. The original ideas influencing the master's programme in the 70s are similar to the description provided by Bernstein (2015) on current issues in transdisciplinarity, such as the ability to think laterally, imaginatively, and creatively about the solutions to specific problems.

Analysing the concept of research in the upcoming teacher education programme

The term "document" covers many different materials, including official documents, records, emails, visuals, and conversations. In organisational and social life, documents are pervasive. "If we wish to understand how organisations and social settings operate and how people work with/in them, then it makes sense to consider social actors' various activities as authors and audiences of documents (Coffey, 2014, p. 368). Studying the textual communicative practices of organisations and institutions can reveal how these constitute "reality". However, it is important to keep in mind that the analysis of formal documents will only explain some aspects of this 'reality'. Different types of documents enable information dissemination and are often developed with particular use of language and form. Genres, specific styles, and conventions are used to constitute and conform to different types of documents. Both Coffey (2014) and Gall et al. (2003) stressed the importance of considering the context of the studied document.

> Thus, all documents are, in that sense, artefacts that are created for a particular purpose, crafted according to social conventions to serve a function of sorts. It is this social production (and indeed consumption) of documents that gives them analytical affordance. (…) Documents are 'social facts', in that they are produced, shared and used in socially organized ways. They are versions of reality, scripted according to various kinds of convention, with a particular purpose in mind (Coffey, 2014, p. 369).

However, written text or other types of documents alone cannot reveal how regulations are affected or how an organisation operates in practice. In this article, the concept of research in upcoming national curriculum regulations is analysed. A broader analysis, such as interviews with gatekeepers and stakeholders in teacher education, could initiate a discussion of different curriculum domains (Goodlad et al., 1979) and the implementation of the concept in various teacher education programmes.

Summative content analysis

In approaching this analysis, expectations were based on the work of Fure (2007, 2010) and Dunin-Woyseth (2008) and their recognition of the master's programme in art and design education as transdisciplinary in its core. In this article, the transdisciplinary approach to art and design education is regarded as among the art and design education community's legacy, although not explicitly stated within the community. The analysis was conducted following summative content analysis (Hsieh & Shannon, 2005). This implies starting with the identification and quantification of certain words or content in the text. The aim was to explore usage, not an attempt to infer meaning. The next sequence was to include latent content analysis—the process of interpretation (Hsieh & Shannon, 2005, p. 1283). The interpretation aimed to discover the underlying meanings of the words or the content. According to Hsieh and Shannon (2005), the advantage of summative content analysis is that it is neither unobtrusive nor nonreactive. However, there are also disadvantages. "It can provide basic insights into how words are actually used. However, the findings from this approach are limited by their inattention to the broader meanings present in the data. As evidence of trustworthiness, this type of study relies on credibility" (Hsieh & Shannon, 2005, p. 1285). To meet the challenges of this type of analysis, we relate to Coffey and the social aspects of analysing documents. Coffey described both writers and readers as social actors. Both bring to bear their knowledge of conventions in the production and reception of written documents. The knowledge may often be tacit. Both the production of text and reading text concern 'making sense'. Writers and readers contribute to the construction of 'what is going on', or 'the state of affairs'. Documentary realities are built, consolidated, and confirmed. Making sense of documents presupposes cultural competency. If the document makes sense, it presupposes a community of readers and writers who share a similar stock of knowledge and disregard assumptions. The analysis of the national curriculum regulation is conducted from the viewpoint of design, art, and crafts, alongside exploring the assumption that the master's programme in art and design education is transdisciplinary at its core.

Keywords and interpretation

The document under study covers six pages. It is divided into the following sections: *Section 1. Scope and objective, Section 2. Learning outcomes, Section 3. Structure and content of the teacher education programme in practical and aesthetic subjects for Years 1–13, Section 4. National guidelines and programme description, Section 5. Provisions concerning recognition and exemption*, and *Section 6. Entry into force and transitional arrangements.* Given that the research question concerned the concept of research, this term was the most obvious keyword in this study. An initial review of the document revealed the term 'science' and/or 'scientific' as a relevant keyword. A final keyword was "R&D" (research and development), which is used in the document as a description of a specific type of paper implemented at cycle 1. All sections were analysed while searching for these keywords. The first match on the keyword "research" was at the beginning of the document – a formal statement addressing the Ministry of Education and Research. This reference is not regarded as a contribution to an understanding of the concept of research in the document and is thus not included in the analysis.

Below is a descriptive summary of the appearance of the keywords in the document and a first initial interpretation. A more thorough interpretation follows in the discussion. The specific keywords appeared in Sections 1, 2, 3, and 4.

Section 1. Scope and objective: This section presents the scope and objectives of the curriculum regulations in five paragraphs. The keywords 'research' and 'science' are applied in paragraph three:

> (3) The objective of these regulations is to ensure that educational institutions offer integrated and profession-orientated teacher education of high quality in practical and aesthetic subjects. The programme must promote quality teaching in schools and cultural schools. The core of the programme is the science subjects and the knowledge and skills areas of the practical and aesthetic subjects. The programme must be rooted in research and experience-based knowledge and provide comprehensiveness and correlation between subjects, professional subjects and practice (Ministry of Education and Research, 2020, p. 1).

This paragraph states that the aim of the regulation is to ensure that institutions offering this type of teacher education hold specific standards and answers to specific criteria. Research- and experience-based knowledge is promoted as the roots of the programme. This quote also includes the keyword 'science'. Science subjects are included in the description of the core of the programme, alongside knowledge and skills areas from practical and aesthetic subjects. In this quote, comprehensiveness and correlation between different subjects, professional subjects, and practice are emphasised.

Section 2. Learning outcomes: The learning outcomes correspond to cycle 2, master's degree in the national qualification framework (NOKUT, 2014), and cover knowledge, skills, and general competence. The learning outcomes in the curriculum regulations describe the learning outcomes for a candidate who has completed the programme. Knowledge is described through eight learning outcomes. The term 'research' appears in two of them. Skills is also described through eight learning outcomes, and 'research' also appears in two of these. None of the keywords are applied in describing general competence.

The two learning outcomes addressing research through knowledge are formulated as follows:

> -has specialised insight into a defined subject area (the master's thesis) and thorough knowledge of research methodology and ethics and of profession-relevant research and/or artistic development work (Ministry of Education and Research, 2020, p. 2).
>
> -has knowledge of the teaching profession, of the development of the school system as an organisation, the subjects as school, cultural and research subjects and a broad understanding of the school's mandate and set of values (Ministry of Education and Research, 2020, p. 2).

In the first learning outcome on knowledge, research appears twice; here, the document states that the student is to demonstrate thorough knowledge of research methodology and ethics and of profession-relevant research. The latter may include or be replaced with artistic development work. The second learning outcome implies that a candidate, after completing the programme, can relate the master's subject to school, culture, and research, including different aspects of the teaching profession, the school's system, mandates, and values.

The two learning outcomes addressing research through skills are formulated as follows:

> -can carry out an independent and limited profession-orientated research project or artistic development work (master's thesis) that is in accordance with current research ethics standards (Ministry of Education and Research, 2020, p. 3).
>
> -can, alone and in collaboration with others, plan, assess and provide tuition for pupils with different needs, based on national and international research, professional experience-based knowledge and current curricula and other governing documents (Ministry of Education and Research, 2020, p. 3).

The first learning outcome concerns the master's thesis. This is described as independent and limited work, either a profession-orientated research project or an artistic development work. The thesis is expected to be consistent with current research ethics standards. As formulated, this learning outcome promotes a profession-oriented approach to research. It also equates artistic development work with profession-related research.

The second learning outcome on skills is concerned with teaching, planning, implementation, and evaluation. All aspects are expected to be consistent with national and international research. This learning outcome is not about conducting research but rather implementing research-based knowledge in all teaching aspects. A comparison of the two learning outcomes addressing skills revealed a difference. The students' master's thesis is clearly addressed as an independent project, whereas teaching with planning and evaluation is promoted as both individual activity and teamwork.

Section 3. Structure and content of the teacher education programme in practical and aesthetic subjects for Years 1–13: This section comprises nine paragraphs describing how the programme is organised. Progression and correlation between elements are emphasised. All three keywords: research, science/scientific, and/or R&D are included in this section.

The first paragraph describes the structure of the programme and distinguishes between years 1–3 (cycle 1) and 4–5 (cycle 2). The description indicates an R&D paper with 10 credits, which includes both the professional and the master subject. The description of years 4–5 includes the master's thesis. The credits should be a minimum of 30 credits or a maximum of 60 credits. As part of the training at years 4–5, the courses must include science theory and method at a minimum of 15 credits. This is included in both the professional subject and master's subject (Ministry of Education and Research, 2020, p. 4).

Paragraph 2 is concerned with educational practice and stresses the progression expected throughout the programme.

> There must be progression in practice, from observation and analysis at the start of the programme to being able to improve experience and research-based teaching practices in the latter part of the programme. (Ministry of Education and Research, 2020, p. 5).

Progression is characterised by the student being an observer in the early years of the training, although they are expected to improve and develop their teaching based on experience and research-based teaching practices throughout the programme. This is interpreted as relying on research when planning, conducting, and evaluating teaching.

Paragraph 5 complements the demands for science and scientific methods.

> Theory of science and scientific method must be introduced at an early stage of the course of study. There must be progression in this topic for the duration of the programme and the topic must be related to both the professional and school subjects (Ministry of Education and Research, 2020, p. 5).

Paragraph 6 is about the R&D paper to be written during Cycle 1. The term is used twice in this paragraph. The first occurs in stating that a profession-orientated R&D paper must be written and that this paper combines Subject 1 and professional subjects. It is stressed that this paper must be passed before commencing the master's thesis. The content and scope of the R&D paper are described as follows:

> The R&D paper must be a minimum of 10 credits and thematise issues related to the characteristics of the practical and aesthetic subjects, knowledge base, history, practical and aesthetic processes and/or basic values. The purpose is to see several practical and aesthetic subjects in context (Ministry of Education and Research, 2020, p. 5).

The last paragraph that mentions a keyword is paragraph 7. This paragraph is concerned with the master's thesis. It is stated as follows:

> The master's thesis is based on the master's degree subject (subject I) and must be a profession-orientated and practice-based research project. It must include elements of practical creative and/or performing activities (Ministry of Education and Research, 2020, p. 5).

Neither the term research nor science/scientific is used when describing the R&D paper conducted at cycle 1, years 1–3, although paragraph five implies that science theory and methods are to be introduced early in the programme and that progression is emphasised. As an opposite, the master's thesis is clearly stated as a research project and described as both profession-oriented and practice-based, including practical, creative, or performing activities.

Section 4. National guidelines and programme description: This section describes the role of the national guidelines and the local programme. It is stressed that national guidelines must leave room for innovation and institutional adaptation (Ministry of Education and Research, 2020, p. 5). This section contains three paragraphs. The third paragraph reveals what a programme description at the local level must include.

> The plan must describe how the institution's study programme allows for progression in terms of focus on professional practice, practice, developing the students' R&D skills and developing their communication skills (Ministry of Education and Research, 2020, p. 6).

In this paragraph, R&D skills are described as skills that need to be developed throughout the programme.

Discussion

The aim of this article was to discuss the following research question: What characterises the concept of research in Norwegian national curriculum regulations? How does the concept of research correspond to the legacy of the master's programme, established in 1976? In this article, the legacy of art and design education is anchored in the master's programme in art and design education that originated in the 1970s and the interconnections with current issues in transdisciplinarity. In the analysis of the curriculum regulations, three keywords were located, and a first initial interpretation was presented. In the next section, a more thorough interpretation and discussion of the topic follow.

A practical and applied approach to research

In the national curriculum regulations, it is stressed that the programme should be rooted in research and experience-based knowledge. The core of the programme is described as the science subjects and the knowledge and skills areas of the practical and aesthetic subjects (Ministry of Education and Research, 2020, p. 1). By comparing the description of the roots, which includes research and experience-based knowledge, and the description of the core of the programme, an assumption emerges—the descriptions imply a practical and applied approach to research. The understanding of the concept is broadened in the learning outcomes, whereas thorough knowledge of research methodology and ethics alongside profession-relevant research and/or artistic development work is included. The close relationship in the text between research and experienced-based knowledge can be considered an invitation to practiced-based and/or practice-led research conducted from an insider perspective. Research in crafts, conducted from an insider perspective, is emerging in academia. These approaches offer both opportunities and challenges (Riis & Groth, 2020).

Mode 2 of knowledge production has been characterised by an outspring in a particular context of application; this implies its own distinct theoretical structure, research methods, and modes of practice (Gibbons et al., 1994). In the 5-year programme for teacher education in practical and aesthetic subjects, limited to design, art, and crafts, modes of practice can be educational oriented or studio-oriented, each implying a distinct context of application. In the learning outcomes, profession-relevant research and artistic development work are juxtaposed. This is interesting regarding the concept of research. In hindsight, it can be regarded as an inclusion of the ideas inherent in the original master's programme in art and design education from 1976. Dunin-Woyseth (2008) identified 2004 as the year AHO decided to accept artistic work as an argumentation and not just an illustration in PhD theses. Dunin-Woyseth also identified similarities between the master's programme, origination in the 70s and international changes in current research; this concerns the role of the artistic work. It is indicated that the master's programme was ahead of its time in accepting creative work and knowledge production through the process of 'making'.

Although the concept of research in curriculum regulations is closely related to the professions, it clearly acknowledges science theory, research methodology, and ethics as central components of the concept. This implies that the concept of research is open to a variety of different approaches to knowledge production and theoretical perspectives. Fure (2007, 2010) promoted Mode 2 as a concept that accepts and encourages knowledge production *through* the fusion of different theoretical concepts and the inclusion of creative work. Mode 2 has also been described as a flat structure, a counterweight to the hierarchical structure of Mode 1. According to Fure, what has been the characteristic of the master's programme in art and design education is combining different aspects in one whole, not treating them as separate blocks. Fure stated that the subjects included break through the academic wall by integrating theoretical studies into the artistic/creative studies, not by placing them one category as a block beside the other. In summary, it is possible to identify approaches to knowledge production in the curriculum regulations following the master's origination in the 70s and Mode 2 of knowledge production.

Solo or teamwork?

Bernstein (2015) acknowledged both teamwork and solo transdisciplinary as legitimate within transdisciplinary research. In Fure's (2007, 2010) description of the master's programme, teamwork is not emphasised. It is the single master's student in dialogue with his or her supervisors that emerges throughout the text. In comparing the learning outcomes of skills, it becomes evident that neither the master's thesis nor the R&D paper is promoted as teamwork in the curriculum regulations. However, when tracing the keyword *research*, an interesting aspect emerged. Educational practice should be research-based; this implies drawing on national and international research. Educational practice should also be conducted both individually and in collaboration with others. Educational practice appears in

many ways as a counterweight to the master's thesis, formulated explicitly as independent work. This is an aspect that may be taken into consideration when further developing the upcoming teacher education programme.

Mode 2 and transdisciplinarity are concerned with real-world problems and promote both solo and teamwork. One explanation is the complexity of the subject under study. In addressing the curriculum regulations, real-world problems can be understood within the frames of profession-based research. This may imply working on issues of relevance to the profession. However, emphasis on real-world problems, wicked problems, and engaging in socially responsible science often demands going beyond the single profession. Several issues in modern society, such as sustainability, cannot be solved within the framework of just one discipline or profession. This aspect is also strongly emphasised in the Norwegian curriculum for general education (Utdanningsdirektoratet, 2017). To fully exploit the potential of transdisciplinarity, this article suggests that curriculum regulations should invite collaboration and teamwork as part of the concept of research. This could imply students, the practice field, and researchers working together in joint projects on equal terms. Joint projects could also involve students from various professions investigating research questions together. The analysis conducted invites further work on this matter.

Conclusion

The analysis revealed a profession-based research concept promoted in Norwegian national curriculum regulations. Artistic development work was addressed as equivalent to research. Mirrored in the master's programme in art and design education, which originated in the 1970s, it is clear that the creative work still holds a strong position in the programme as well as in the master's thesis. The analysis also indicates that a mix of disciplines and positions is promoted in the curriculum; this also follows the legacy of the original master's programme and is in line with transdisciplinarity and Mode 2 of knowledge production. The analysis invites a discussion of further development of the 5-year teacher education programme. According to the curriculum regulations, educational practice is to be conducted both individually and in groups. This is not an obvious option for the master's thesis. To fully exploit the potential of transdisciplinarity, curriculum regulations should invite collaboration and teamwork as part of the concept of research. This could involve students, the practice field, and researchers working together on joint research projects, but also bringing students from different professions together to pursue real-world problems from different angles and perspectives.

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