Guiding thesis circles in higher education: Towards a typology

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Provide short biographical notes on all contributors here if the journal requires them.

Guiding thesis circles in higher education: Towards a typology

Although the thesis is an integral part of the study programme, the way the guidance for this work is supervised can highly differ between supervisors. Writing the thesis is a complicated process requiring tailored guidance, that is often not feasible due to increasing numbers of students and need for efficiency. One possible solution is working with thesis circles: small collaborative groups in which students, together with one or more supervisors, conduct research on the same subject or theme. Thesis circles offer opportunities for self-regulated learning, (peer) feedback and prevention of feelings of loneliness. In this study we construct a typology for thesis circles aimed at supervisors following an Educational Design Research (EDR) approach. Based on a literature review and interviews, we formulate the boundaries of a thesis circle and identify 23 design characteristics that determine an instantiation of a thesis circle. This is developed into a typology, that is evaluated in a focus group. Avenues for future research are presented.

Keywords: thesis circles, social learning, dissertation, educational design research, typology, support

Subject classification codes: include these here if the journal requires them

Introduction

Considered by many as the ultimate challenge of their higher education programme, students conduct and report on independent academic research in the form of a thesis at the end of their studies (Romme and Nijhuis 2002). The nature of this task brings together several key skills such as academic literature search and academic writing, metacognitive skills (e.g. task orientation, goal setting and planning) and critical thinking, and reflection skills to develop new knowledge (Romme and Nijhuis 2002). Working individually on such a complicated task under the guidance of a supervisor, students often feel isolated without social interaction with their classmates and are unable to develop certain learning skills in an authentic way (e.g. providing feedback or viewing a concept from multiple perspectives) (Rajagopal *et al.* 2019, Verjans *et al.*

2018). From the perspective of the supervisor, the support and guidance required by students often needs to be customised to their abilities, while keeping task responsibility with the student, resulting in high workload for supervisors (Romme and Nijhuis 2002). In many higher education institutes, individual supervision is no longer feasible due to the increasing number of thesis students (De Beer and Mason 2009, Granström *et al.* 2018, Greenberg and Moore 2013, Rajagopal *et al.* 2019, Roberts and Seaman 2018, Verjans *et al.* 2018). In response to these problems, as a form of group supervision, thesis circles become an emergent practice for supervising graduation theses for the bachelor's and master's programs in higher education.

Thesis circles - small collaborative groups in which students, together with one or more supervisors, conduct research on the same subject or theme – allow for both comprehensive support and guidance (including peers) for the thesis task, as well as a workable solution for the workload of teachers (Romme and Nijhuis 2002). Thesis circles differ from other research student writing groups (such as collaborative problem-solving groups (Sun et al., 2020) or collaborative writing groups (Raes & Montero-Perez, 2019), in that students in thesis circles still conduct their research individually, producing their own written thesis or dissertation manuscript at the end in order to obtain a degree. Haas (2011) shows that participation in such groups and the opportunity of (peer) feedback enables participants to increase both quality and quantity of their work. Belonging to a group increases their motivation and confidence, while at the same time it decreases their anxiety and isolation (Verenikina 2012).

Thesis circles are a form of social structure built on social learning theory (Bandura 1977), and as such exhibit the same social mechanisms as communities, teams, and networks (Granovetter 1973, Lave and Wenger 1991). Research in educational settings shows that these are found to stimulate and facilitate participants' professional development (Nijland *et al.* 2018,

Vrieling-Teunter *et al.* 2016). Depending on how they are used, thesis circles portray more similarities with any of these social mechanisms. The community aspect is important in thesis circles, because community members are informally bound by what they do together and by what they have learned through their mutual engagement in these activities (Wenger 1998). Thesis circles can also function as teams, defined as 'groups of people that work together cohesively toward a common goal' (Dechant *et al.* 1993, p. 1). Students can share for example the same dataset, in this way being responsible for a common goal, but also write their own individual thesis. Thesis circles can also portray characteristics of a network, when they focus on the diversity of social relationships between members and the impact of these relationships on learning (Hanraets *et al.* 2011). The design of the thesis circle, as a network, can encourage (1) question-answering (Fetter *et al.* 2015), (2) peer tutoring (Hsiao *et al.* 2016), or (3) meaningful network building (Rajagopal *et al.* 2017).

Thesis circles are built upon student-centered learning focusing on the learner and their needs. This stems from the field of cognitive psychology where the established paradigms of social constructivist learning theories emphasize the importance for students to actively engage in constructing their own understanding (Power 2016). One of the shared assumptions of social constructivist learning theories is the significance of self-regulated learning (SRL) as the key component for successful learning in school and beyond (Zimmerman 2001). In general, SRL is defined as 'an active, constructive process whereby learners set goals for their learning and then attempt to monitor, regulate, and control their cognitions, motivation, and behaviour, guided and constrained by their goals and the contextual features in the environment' (Pintrich 2000, p. 453).

In their SRL model for higher education, Vrieling-Teunter *et al.* (2018) distinguish between the perspectives of the learning task (i.e. the thesis), the teacher (i.e. teacher guidance in thesis circles) and the learner (i.e. the student). When these three perspectives are well attuned to each other, academic performance emerges. Vrieling-Teunter *et al.* (2018) stress the importance to balance between student- and teacher-control to avoid students' uncertainty and develop sufficient knowledge building.

Following Vygotsky's sociocultural theory, thesis circles provide a social environment in which such a balance is promoted by actively co-constructing knowledge through a collaborative dialogue between the more knowledgeable facilitator (thesis supervisor) and learners (students) and by using scaffolding (i.e. indirect support technologies), such as "modelling, questioning, hinting, providing guidelines, giving analogies, suggesting strategies, and breaking the content into manageable pieces" (Verenikina 2012, p. 480). Previous studies have indicated that students experience difficulties of dealing with ambiguity and uncertainty of group discussion (Verenika 2012) and therefore appreciate supervisors' feedback on their draft work, even if only in the form of confirmation (Vrieling-Teunter *et al.* 2018).

Metacognition - defined as the knowledge about and the regulation of one's cognitive activities in learning processes - is an important SRL area relevant to thesis work (Pintrich 2000, Veenman *et al.* 2006). Supervisors can enhance students' metacognitive skills in the form of reflective questioning, a scaffold aimed at developing students' critical thinking through the posing of questions eliciting reflection (Van Seggelen-Damen and Romme 2014). Van Seggelen-Damen and Romme (2014) found that different thesis circle types engaged students in different types of questions and culture of critical reflection. With regard to questioning, instruction-oriented circles (supervisor-centered) focused more on provocation and heuristics while

questioning in coaching-oriented ones (student-centered) focused more on the need for cognition and levels of abstraction. As for culture, students in instruction-oriented circles were less curious and tended to be unaware of their own thinking while students in coaching-oriented circles were more willing to raise doubts and ask questions. These findings suggest that coaching-oriented circles are likely to motivate students to speak up, to share knowledge, and to be critical of each other's work through raising questions and doubts.

Although thesis circles could offer solutions to create all-round support and guidance in a structure that takes into account teacher workload, supervisors might require support in their design and use of thesis circles. Social learning environments such as thesis circles have been shown to support "designer instructors" who plan learning and teaching processes for their students (Czerkawski 2016). Moreover, instructional design in these types of environments is complex and interdisciplinary requiring more insight into design choices (Goodyear and Carvalho 2014). Our overarching research questions are formulated as follows: (i) What are the key design characteristics of thesis circles? (ii) How can these design characteristics be used to create support for thesis supervisors in the creation and use of thesis circles? In answering the research questions, we draw on three didactical principles that we have derived from our theoretical framework: (1) social structure, (2) SRL, and (3) scaffolding metacognition in the form of reflective questioning.

Methodology and Structure of this article

This research, conducted by five senior researchers that are also thesis supervisors at different universities in the Netherlands and Belgium, follows an Educational Design Research (EDR) methodology, a framework for educational research that takes into account the iterative and practice-oriented nature of design research (Mckenney and Reeves 2019). In EDR, research

is structured in three phases (analysis/exploration, design/construction and evaluation/reflection) that lead iteratively to a more mature intervention as well as ongoing improved theoretical understanding. In this article, we describe three studies - one for each phase in EDR – that look into the design of support aimed at supervisors of thesis circles. In the remainder of this article we first present three studies in the analysis/exploration phase, the design/construction phase and the evaluation/reflection phase, going into their method and findings. We then provide a discussion across the three studies. Finally, we present general conclusions and limitations.

Study 1: Analysis and Exploration

The focus of the analysis and exploration phase was to understand the context and definition of thesis circles, their benefits and drawbacks, and their key design characteristics, as formulated in the following research questions:

- RQ1a: What is a thesis circle, what are its scope and boundaries?
- RQ1b: What are teachers' experiences of the benefits and drawbacks of thesis circles in practice?
- RQ1c: To what extent is the didactic grounding (social structure, SRL, scaffolding metacognition in the form of reflective questioning,) reflected in the current practices?
- RQ1d: What are the design characteristics that define a thesis circle?

Method

Three activities were conducted in the analysis and exploration phase: (1) exploratory interviews, (2) a scoped literature search; and (3) joint analysis of interviews and literature cases.

Exploratory interviews

To collect profound experiential data on thesis circles, in a first exploratory phase, semi-structured interviews were conducted (Alvesson and Ashcraft 2012). We interviewed eight (assistant and associate) professors at three Dutch universities who supervised groups of bachelor, master and/or PhD students. They were approached in the authors' networks based on their use of thesis circles as a form of graduation group supervisions. The interviewees' credentials were anonymized. During the interviews (conducted face-to-face and online, by three of the five authors), the interviewer took the notes, made a summary based on the notes and asked the interviewee for approval of the content. Interviews were held using a pretested semi-structured interview guide (Kallio *et al.* 2016), involving explorative guiding questions on (1) basic information of the interviewee, (2) introduction to this study, (3) opening questions, (4) history of thesis circles organized at the interviewee's institution, (5) descriptions of the current circle set-up, as well as (6) interventions and successful factors/drawbacks. Each interviewer could choose or reformulate the questions during the interview, based on the context of the circles. (see Annex 1).

Literature search for theoretical framework

A literature search was conducted using a Boolean search with the following keywords: 'groups and teams' AND 'facilitation' AND 'higher education', in the meta-database EBSCOhost, which includes, among others, the ERIC and Web of Science databases, resulting in 27 articles. Peer-reviewed journal articles and book chapters published between 1 January, 2009 and 14 October, 2018 were included. The abstracts of these sources were checked on the inclusion criteria: (1) the study took place in a higher education setting within an undergraduate or graduate programme; (2) the study involved a form of learner support where students give

feedback to each other; (3) the students were responsible to write individual texts or projects; (4) the students were supervised by a supervisor. Exclusion criteria were: (1) the study made no mention in detail of the role of the supervisor and the approach of the supervision; (2) the group of students worked on a shared collective written output (text, project, etc.); (3) the study concerned online guidance of students. This resulted in a final selection of five articles. In addition, the reference lists of the found articles were consulted ('snowballing'; Petticrew and Roberts 2006), resulting in two more studies. In total, seven studies were read in depth and provided the basis for the further analysis: Adriansen and Madsen (2013), Campbell (2015), Haas (2011), Kyprianidou *et al.* (2012), Romme and Nijhuis (2002), Verenikina (2012) and Whiting *et al.* (2012).

Joint analysis of interviews and literature cases

As the interviews and the literature search brought up 15 different cases of thesis circles, it was deemed interesting to analyse the cases together on the same criteria:

- General details of thesis circle: definition, history, number of runs, number of students, etc;
- Procedure and routines of thesis circle: working format, communication processes, supervision style, tasks of the supervisor, role of the supervisor, number of hours spent by student in circle per week;
- Context of thesis circle: role of circle in larger educational programme, goal of circle, assessment of participation in circle, perceived effectiveness by supervisor, supervisor's criteria for determining effectiveness, organisational support for circle.

Template analysis was used involving thematic coding of texts with an increasing level of detail (King 2012). As such, a coding template evolves during coding of a data subset, and can – in contrast to other thematic analysis techniques – be further developed when coding the complete dataset (Brooks *et al.* 2015). This analysis technique is known for enabling the required

amount of coding steps that lives up to the study's goal (King 2012, Brooks *et al.* 2015). Within and between case analysis was applied without a pre-specified order and resulted in a detailed code hierarchy (King 2012). Independent coding, keeping logbook notes, and critical comparison of code sets by five researchers were used to ensure intra- and intercoder reliability.

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Findings

Annex 2 presents a summary of the analyses of interviews and literature review. In answer to RQ1a, current forms of thesis circles in higher education can be described as follows: (1) they consist of at least two students; (2) they are supervised; (3) each student works on an individual writing project in the form a thesis, paper or study, that requires research and textual output; (4) these activities are performed within the setting of an academic programme (such as a Bachelor's, Master's or doctoral programme); and (5) the students are assessed at the end of the activity.

In answer to RQ1b on teachers' experiences, supervisors see benefits of thesis circles for themselves and for students. Students feel less isolated, are more involved in tasks around feedback and assessment and have space to bring in their own perspective, thereby enriching the thesis experience for themselves, the supervisor and their peers. Students also develop lifelong learning skills, in particular SRL. For supervisors, the benefits of thesis circles lie in consistent quality of feedback and supervision, that is balanced between the students as peers and the supervisor as expert.

To answer RQ1c, scaffolding in the form of reflective questioning occurs throughout the studied cases as a central feature of facilitation by the supervisor. SRL occurs in different measures, ranging from academic goal-setting and monitoring, to self-organisation of their interactions with peers or the logistical and practical organisation of thesis circles. The social structure of thesis circles is a key factor in the studied cases, as their organisation shows the different ways in which the social structure of thesis circles is manipulated to achieve the desired learning support and learning outcomes.

Finally, in answering research question RQ1d, 10 design characteristics defining thesis circles emerged from the analysis: (1) genesis of the circles, (2) circle size, (3) primary working form, (4) primary conversational instrument used in the circle, (5) processes within the circle/facilitation of the circle, (6) guidance style used by circle's supervisor, (7) tasks taken on by supervisor, (8) intended purpose of the circle, (9) circle participation as part of thesis assessment and (10) effectiveness of circle according to supervisor. However, the analysis also shows that this list of 10 design characteristics is incomplete, as the analysis has brought up elements of design that either impact the way a thesis circle looks, or how it is implemented and used in practice. For example, the guidance style of the supervisor also has an influence on the social atmosphere in the circle, the expected tasks from the students and the resulting learning outcomes for the students.

Study 2: Design and Construction

Following the findings of the previous study, study 2 aimed to extend the list of 10 design characteristics determining thesis circles, in order to design suitable support for thesis supervisors in the creation of thesis circles. The following research questions were considered:

- RQ2a: What are other design characteristics that determine the design of a thesis circle, apart from the 10 identified in study 1?
- RQ2b: What is a suitable support instrument for thesis supervisors in the creation of a thesis circle, using the design characteristics identified in RQ2a?

Method

In EDR, the design and construction phase is typically used to invent a solution, build it and prototype it within a limited context. The aim of the design and construction phase is not only to design, but also to understand the intentions behind the design (McKenney and Reeves 2019). In this study, that would mean designing a thesis circle

within an educational programme and running it. However, considering the fact that several thesis circles have been run, with different designs, the project team started from these existing cases, to identify the distinguishing design characteristics and their underlying design intentions.

This was done in three steps:

1. Firstly, we identified three (sets of) articles as relevant to explore from study 1: (i) Haas (2011, 2014), who works on writing groups; Romme and Nijhuis (2002), who have a treatise on a particular design for thesis circles; and Vrieling *et al.* (2016), with relevant work on social dimensions for learning.
2. Secondly, the list of design characteristics identified in study 1 was extended based on the studies of Haas (2011, 2014), bringing in the student's perspective; Romme and Nijhuis (2002), elaborating on the role of the teacher as designer and constructive facilitator; and Vrieling *et al.* (2016), looking at the dimensions of social learning.
3. Thirdly, the list of design characteristics was assembled and categorised into design dimensions, through debate in the project team. The discussions resulted in validated naming and definitions of the design characteristics and design dimensions. The outcome was used to construct a typology of design characteristics grouped into design dimensions as a support instrument aimed at thesis supervisors (see Annex 3).

Findings

Before moving on to answering the research questions, we present a brief summary of the three selected resources for more contextualisation of thesis circles. Thesis circles can be seen as a specific form of writers' groups. Based on previous literature and own experiences, Haas (2011, 2012, 2014) identified various elements of successful writers' groups, defined as: "All groups involve writers coming together to support each other, and all groups share the common goal of improving both process and product of writing – but no two groups are alike." (Haas 2014, p. 2). Of particular interest is Haas' typology of categorized elements that can, but not necessarily do, co-occur in successful writers' groups. It includes eleven dimensions: 1) purpose, 2)

membership, 3) leadership, 4) contact, 5) time, 6) place, 7) frequency, 8) length, 9) duration/lifespan, 10) in-meeting activities and 11) between-meeting activities. As not all elements are required for success, Haas (2014) presents this typology as a 'pick-n-mix' tool for theoretical and practical use. Haas (2014) acknowledges that apart from the writing process, activities such as reviewing also contribute to the success of writing groups. As such, thesis circles are a place where students come to meet, be supervised, and additionally act as co-supervisor of other students (Romme and Nijhuis 2002). In this way, thesis circles can be seen as an extension of the supervisor.

Romme and Nijhuis (2002) describe one particular implementation of thesis circle: every thesis circle meeting includes an opening round, an organizational part, a content part, and an evaluation round. The opening and evaluation rounds demarcate the participants' transition from 'the outer world' (including daily hassles) into the meeting and vice versa, and furthermore explicitly acknowledge everybody's presence and contribution. Decision-making in these thesis circles is based on the rule of consent, or non-argued objection (i.e. no participant has an argued objection). As a result, supervisors and students are equal to each other as participants in decision-making, establishing the key principle of shared responsibility. The no-objection rule is used, for instance, when choosing a chairman and scribe, delegating certain powers to members of the thesis circle, or assessing the final version of a thesis (Romme and Nijhuis 2002, p. 11-13).

Thesis circles also build on aspects of social learning in collaborative groups, explored in the Dimensions of Social Learning Framework (Vrieling *et al.* 2016). These dimensions constitute the social configuration (i.e., patterns of behaviour, group constellation, and thinking) of groups. Although developed for groups who share learning goals, the framework can be used to frame social interaction in thesis circles

(where students have independent learning goals) to understand the social learning processes for knowledge creation (such as writing a thesis). It includes four dimensions, with two to four indicators: (i) *Practice* – the reason why a group exists and how it immediately benefits its members in their practice; (ii) *Domain and value creation* – what is shared among group members, such as experience and expertise; (iii) *Collective identity* – who is a group member, and how they work interdependently with a shared purpose and responsibility for collective success; and (iv) *Organization* – how a group is organised. All four dimensions are relevant for the context of thesis circles.

In answer of RQ2a, we compared the list of 10 design characteristics from study 1 (see Annex 2, column 1) with the experiences described by Haas (2011, 2012, 2014), Romme and Nijhuis (2002), and Vrieling *et al.* (2016) to create an elaborated list of 23 design characteristics (see Table 1, column 3). These design characteristics were then grouped into six design dimensions (see Table 1. Column 1) of Goal, Structure, Guidance and Working Format, Culture, Effectiveness/Quality and Risk Factors, discussed below

Table 1. Definitions of design dimensions and related design characteristics

Design dimension in Thesis Circles	Definition	Design characteristics
Goal	The goal is the reason why the thesis circle was organised. This can range from issues on teacher workload, to introducing the development of new types of skills (e.g. collaboration; student autonomy).	Target group Group size Object of supervision Reason Final goal Focus of facilitation Function of group interaction
Structure	The structure of the thesis circle relates to what the thesis circle looks like in practice in terms of temporal and spatial structure, planning and division of responsibilities.	Structuring Planning Duration Frequency
Guidance (and working format)	The guidance of a thesis circle involves the ways in which the students in a thesis circle are supervised. It focuses both on the working formats used, as well as the focus and style of supervision. Leadership of teacher and student is important.	Meeting format Leadership Supervision style Degree of supervision Supervision focus Leadership style
Culture	The culture of the thesis circle relates to the atmosphere created in the circle, the relationship between the participants that is engendered and the social self-regulation (participation) of the participants.	Mutual relationship Atmosphere Social self-regulation

Effectiveness / Quality	The quality or effectiveness of a thesis circle is the impact that the thesis circle has on the quality of the product (the thesis) or the quality of the process to achieve the thesis. It is determined by the priorities of the supervisor.	Quantitative effect measurement Qualitative effect measurement
Risk factors	Risk factors in the use of thesis circles involve the extent to which this mode of thesis guidance does not suit the needs of a student. This can include going too fast, going to slow, less chance for individual creative development, etc.	Heterogeneity

Dimension 1: GOAL

The goal is the reason why the thesis circle was organised. This can range from issues on teacher workload, to introducing the development of new types of skills (e.g. collaboration; student autonomy). On goal, study 1 identified four characteristics (target group, goal of the circle, organisational support of the circle and communication processes), that were nuanced by the literature review. Haas (2011) mentions the importance of membership, as the characteristics of the people who participate in a thesis circle (their learning goals, background, skills) play a role in the learning that can be achieved through a thesis circle. Both Haas (2014) and Romme and Nijhuis (2002) point to the use of writers' groups in improving the quality of products of academic writing, while at the same time making the writing experience itself less isolated. This is supported through different foci in the relationship and interactions between supervisor and students (such as supervision, or student' sense of responsibility), and the students as peers (students' role in supervision of others and exchange of knowledge and experience). Additionally, the development of collective knowledge and skills and shared values, as described in Vrieling *et al.* (2016)'s indicators of "sharing or broadening/deepening knowledge and skills" and "Individual or collective value creation" under dimension *Domain and Value Creation*, are also relevant in thesis circles. This encourages the inclusion of new design characteristics to create the following list on *Goal*: (i) Target group, (ii) Group size, (iii) Object of supervision, (iv) Reason, (v) Final goal, (vi) Focus of facilitation, and (vii) Function of group interaction (see Table 1, column 3).

Dimension 2: STRUCTURE

The structure of the thesis circle relates to what the thesis circle looks like in practice in terms of temporal and spatial structure, planning and division of responsibilities.

Study1 identified two design characteristics (circle size, frequency) that focused on frequency in thesis circles. However, the literature review allowed for a more granular description of structure. Haas (2011) includes time, place, frequency and duration as determining the logistics of writing groups. Moreover, she points to the distinction between groups that come together continuously and groups that are temporary in nature. Also, Vrieling *et al.* (2016)'s indicator on "Temporary or permanent activities" under the dimension of *Practice* reflects this issue. Romme and Nijhuis (2002) focus on the roles and responsibilities taken during thesis circles such as who takes up organisation and sets agendas for the meetings. Moreover, following their model for thesis circles, they also indicate the roles students are advised to take up, namely, that of co-supervisor and chairperson of meetings. Therefore, the list of design characteristics related to structure was adapted to: (i) Structuring, (ii) Planning, (iii) Duration and (iv) Frequency.

Dimension 3: GUIDANCE (AND WORKING FORMAT)

The guidance of a thesis circle involves the ways in which the students in a thesis circle are supervised. It focuses both on the working formats used, as well as the focus and style of supervision. Leadership of teacher and student is important. Study 1 resulted in the definition of 4 design characteristics: working format; role of the supervisor in the working of the circle; supervision style; tasks of the supervisor. Additionally, Haas (2014) points to *leadership roles* as an aspect defining writing

groups: there are several activities in the meeting itself and between meetings on which leadership needs to be taken. These activities can be led by students to achieve different learning goals, supporting the transition from teacher-directed to student-directed working. In Romme and Nijhuis (2002), students take on roles of co-supervisors and chairpersons, indicating forms of shared responsibility between supervisors and students. They specify as well that "teachers and students are equal to each other as participants in decision-making, which is necessary to substantiate the key principle of shared responsibility." (Romme and Nijhuis 2002, p. 13). This form of student-directed working in thesis circles can lead to shared and deepening knowledge and skills through dialogue (Vrieling *et al.* 2016, Dimension 2: Domain and Value Creation/ Indicator 3), and show different forms of external direction or self-organisation and hierarchic or equal relationships within the circle. (Vrieling *et al.* 2016, Dimension 3: Organisation/ Indicator 8/Indicator 10). Organisation and facilitation are complex concepts that are highly interrelated with the priorities and vision of the supervisor, thereby needing more nuanced descriptions. The design characteristics of supervision style, supervision focus and leadership style have been added, referring to the point-of-view of the supervisor – next to meeting format, leadership, and degree of supervision.

Dimension 4: CULTURE

The culture of the thesis circle relates to the atmosphere created in the circle, the relationship between the participants that is engendered and the social self-regulation (participation) of the participants. Study1 pinpointed three design characteristics on culture that were primarily led by the supervisor's vision, style and preferred roles (communication processes; supervision style; tasks of the supervisor; role of the supervisor). The literature review nuanced this aspect significantly. Haas' study shows that for a student, 'academic' activities were not seen as the main benefits. Rather,

affective benefits “were much more valued.” (Haas 2014, p. 86). The key principle of shared responsibility in Romme and Nijhuis (2002) also set the outline for the atmosphere within the thesis circle. They also point to the extent of support given to students in growing their roles as co-supervisors and chairpersons, through instructions for effective communication in thesis circles. The supervisor’s task in enabling this is to act as a role model, coach and advisor (Romme and Nijhuis 2002, p. 32). Vrieling *et al.* (2016)’s dimension of *Collective Identity* talks to this aspect of culture through the focus on shared or unshared identity (indicator 5), strong or weak ties (indicator 6) and the extent to which students are task executors or knowledge workers (indicator 7). Additionally, an important aspect indicated in dimension 4 of *Organisation*, Indicator 11, is the extent to which the members of a thesis circle share interactional norms, that determine the culture in the thesis circle. In other words, the ‘social’ aspect of thesis circles is a crucial element in defining the learning outcomes, leading us to define three design characteristics related to culture: (i) Mutual relationship, (ii) Atmosphere and (iii) Social self-regulation.

Dimension 5: EFFECTIVENESS/QUALITY

The quality or effectiveness of a thesis circle is the impact that the thesis circle has on the quality of the product (the thesis) or the quality of the process to achieve the thesis. It is determined by the priorities of the supervisor.

Study1 identified three design characteristics related to effectiveness and quality, that put an emphasis on the supervisor’s perspective on the use of the thesis circle and resulting performance of the students. These are assessment of participation in circle, perceived effectiveness by supervisor and supervisor’s criteria for determining effectiveness. Haas (2014) indicated several other issues related to the student’s

experience of participating in the writing groups, e.g. increased output and better written product, increased motivation, reduced feeling of isolation and increased confidence. Romme and Nijhuis (2002) also point to the students' feelings of independence and their collaborative behaviour as a result of participating in the thesis circles. This experiential aspect is also brought up by Vrieling *et al.* (2016) in Indicator 4 on 'Individual or collective value creation' part of the dimension *Domain and Value Creation*. Taking these into account, the design characteristics on effectiveness/quality were reformulated as (i) quantitative effect measurement and (ii) qualitative effect measurement, purporting that measuring the effectiveness of a thesis circle can occur both in quantitative and qualitative ways, and depend highly on the purpose of the thesis circle, as intended by the supervisor.

Dimension 6: RISK FACTORS

Risk factors in the use of thesis circles involve the extent to which this mode of thesis guidance does not suit the needs of a student. This can include going too fast, going to slow, less chance for individual creative development, etc.

Although we did not identify any design characteristics related to risk in study 1, it did come to the fore in the literature review. Haas (2014) identifies a number of "troubles" that can play a role in writing groups, such as timing, commitment, interaction, reinforcing each other's bad habits and personality conflicts. Romme and Nijhuis (2002) point to the need for supervisors' to be more directive with students when necessary to keep the workshops focused. The shared interactional norms, including the resulting effectiveness of these interactions, also appear in Vrieling *et al.* (2016)'s dimension on *Organisation*. In other words, there are risk factors involved in using thesis circles (e.g. because of differences in student learner skills, insufficient or

inappropriate support for present needs, etc.) and to capture these, we included the design characteristic of heterogeneity.

Answering RQ2b, the design characteristics and design dimensions presented above have been compiled through project team debates (step 3 in method) into a typology that can support supervisors in the design of their thesis circles (see Annex 3). For each design characteristic in this support instrument, a scale was devised to illustrate the options of the design choice for a supervisor who wishes to use thesis circles.

Study 3: Evaluation and Reflection phase

In the last phase in the design loop of EDR, we considered an evaluation of and reflection on the outcome of study 2, i.e. the typology as a support instrument for thesis supervisors. In this study, we aimed to answer the following research questions:

- RQ3a: How do teachers receive the typology?
- RQ3b: Are there any changes to be made to the typology?
- RQ3c: Do teachers expect to use the typology in their practice?

Method

The typology was discussed in a focus group of seven assistant and associate professors working in higher education, at a Dutch conference. The working format was a 30-min roundtable discussion, moderated by three of the authors, who took notes. With a handout of the typology, the participants were posed questions such as: (1) Is the typology recognisable? (2) Do you have experience with these design characteristics? (3) What works for you, what does not work and what do you think is missing? (4) Which characteristics of the typology could increase the effectiveness of the thesis circle? and (5) Do you find it useful to study the effectiveness and efficiency of thesis circles from a student's perspective?

Findings

The participants shared experiences and educational vision on collaborative learning and peer review. They recalled both formal and informal initiation of thesis circles, run both with and without organizational support and varied in workload (18, 20, 30 ECTS credits), in curriculum location (bachelor or master program), and in duration (one year or less). Based on their answers, the participants in general recognized the typology, and looked for guidelines for effective coaching of thesis

circles. They argued that there is no ‘one size fits all’ when coaching thesis circles. They advocated a demand-driven orientation (students 'leading the way') and mentioned the use of planned thesis circle sessions, and connecting students for giving and receiving feedback. Although effectiveness and efficiency measures were not explicitly discussed, participants in the focus group did mention that thesis circles were initiated as part of an efficiency improvement program, including external assessors, supervisor/coach circles focused on peer review and assessment calibration, an assessment form and spin-offs such as trainee circles. Critical reflection on thesis circle effectiveness and efficiency from a student perspective is considered useful.

Answering the research questions, the typology with a variety of design characteristics is recognized in educational practice. Furthermore, peer review and consultation on coaching style is considered helpful. This pleads for a supervisor/coach reflection tool that acknowledges the variation in different design characteristics, and on the basis of which one can determine and self-regulate one’s coaching style.

Discussion

We discuss the results around three themes. A first theme concerns support as a reflection instrument. The typology from study 2 aims at monitoring the working process within thesis circles to support decision-making on this process, and is not an evaluation instrument to assess the quality of thesis circles. This is in line with the work of Haas (2011, 2012, 2014) and the way she positions her typology for writer's groups. Parallel to Haas (2011, 2012, 2014), any evaluation of the advantages and disadvantages of a thesis circle must be assessed in light of the needs of the participants of a specific thesis circle. In our typology, we have included effectiveness/quality as a design dimension that thesis supervisors can use to monitor the functioning of their thesis circles.

A second theme concerns the intentions of the supervisor. The studies have made clear that thesis circles can be diverse in their design, and be used to support the achievement of different learning outcomes. As a working format, they function on a spectrum from very flexible to very rigid. The studies have made apparent the significant role of the supervisor in determining the design of the thesis circle in this spectrum. The supervisor's intentions largely determine which learning outcomes can be achieved by the student. For example, if students are responsible for self-organising their regular meetings, they can develop planning and organisational skills.

A third theme concerns the didactic grounding of thesis circles. In these studies, we focused on three aspects: SRL in students with scaffolding as a leading principle, reflective questioning as a method to enhance metacognitive skills, and social structure within thesis circles. The outcomes of the studies have shown that these aspects are certainly relevant, but also that further investigation is necessary to understand how they work together to make thesis circles effective learning environments. Although our support instrument describes the design dimensions on which supervisors can make

choices, it does not yet indicate how these choices enable these didactic aspects to work in practice. Moreover, these studies have only allowed for a first attempt in development of these theoretical topics. For example, the area of motivation in the SRL model (Pintrich, 2000) has not been considered in this article.

Conclusions

Using Educational Design Research, we have presented the outcomes of three studies in a first iterative design loop.

In answer to the first overarching research question, in Study 1, a definition of thesis circles in higher education (including an initial list of 10 design characteristics) was formulated: (1) they consist of at least two students; (2) they are supervised; (3) each student is working on an individual writing project in the form a thesis, paper or study, that requires research and textual output; (4) these activities are performed within the setting of an academic programme and (5) the students are assessed at the end of the activity. Working from research on writers' groups (Haas 2011, 2014), a specific format of thesis circles (Romme and Nijhuis 2002) and social learning dimensions (Vrieling *et al.* 2016), we determined 23 design characteristics grouped in 6 design dimensions (Table 1) in study 2. These were used to construct a typology aimed at thesis supervisors to support the design of and reflection on thesis circles see Annex 3).

In answer to the second overarching research question: In study 3, the typology was confirmed as a useful instrument to support thesis supervisors in their reflection on their use of thesis circles. In particular, the need was expressed to support thesis supervisors in developing their coaching style.

We see the following limitations and avenues for future research:

Firstly, this research only focuses on the supervisor's perspective (regarding scaffolding and facilitation), and does not explore the students' perspective. In future

research, we want to include students' learning experiences to understand how thesis circles function for them. This will allow the typology to develop into potentially an evaluation instrument.

Secondly, our studies do not show to what extent social learning is actually realized, i.e. how both students and supervisors learn from the environment of thesis circles. Additionally, we have not investigated extensively how thesis circles relate to other forms of social learning such as communities of practice, networks or teams, although this topic did emerge several times in team discussions. This is in focus in future research.

Thirdly, since the literature review in these studies was limited due to the priorities of the project, there is a need to systematically review literature on writing in collaborative groups. For example, there is much literature on writing groups in doctoral education that was excluded in this article, which has a focus on undergraduate and graduate education. Future work needs to distinguish how writing groups can be used in different levels of higher education.

Fourthly, analysis in this research was focused on identifying the crucial design characteristics distinguishing thesis circles to create support in the form of a typology to an intended target group of supervisors. However, future interest lies in understanding which aspects of design contribute to the effectiveness of thesis circles, both for students and supervisors. In future research, we aim to create a more thorough analysis of design, as purported in EDR with the identification of design conjectures from practice and research, allowing for more nuanced forms of support, connecting intention of design with design characteristics and parameters.

Lastly, we have also not looked at the organisational value of thesis circles within higher education institutions, especially in light of the concept of "third spaces",

spaces that are self-organised by students for learning, outside of institutional boundaries (Vivian et al., 2014, Salmon *et al.* 2015, Aaen and Dalsgaard 2016).

Through this research, we have shown thesis circles as a specific form of social learning environments that enable scaffolded development of metacognitive skills and social skills. Using EDR, we explicated nuances in the complex design of thesis circles to develop an appropriate instrument to support supervisors in the guidance of thesis circles. We envision a wide applicability of the outcome of this work, for example in the extension of the typology to other social structures such as communities of practice, networks and teams.

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