



JUTLP

Journal of University Teaching & Learning Practice

Designing a Thesis Supervision Model: Combining Individual, Group and Cohort Activities to Support Thesis Finalisation Self-Efficacy

Laivi Laidroo^a and Kätlin Vanari^b

^aTallinn University of Technology, Estonia; ^bTallinn University, Estonia

Abstract

Although undergraduate thesis finalisation tends to improve when individual and group supervision activities are combined, theoretical justification for such combinations and evaluation of their sub-components' comparative impact on student progression remain limited. To address this gap, we introduce the concept of thesis finalisation self-efficacy (TFSE), the students' belief in their ability to finalise a thesis, grounded in self-efficacy theory (Bandura, 1977) and link it to the performance model of social cognitive career theory (Lent et al., 1994). Using a five-stage design research approach, with survey and interview data from students and supervisors, we explore the application of the TFSE-supporting supervision model, combining individual and group supervision activities with preparatory cohort activities, within an undergraduate business administration programme at a public university in Estonia. The results show that the TFSE was perceived to be most strongly supported through vicarious experiences provided by group meetings, mastery experiences derived from supervisor feedback on thesis plans and drafts, and verbal persuasion by the supervisor during group meetings, while cohort activities and peer interactions outside group meetings had comparatively weaker perceived impact. Nevertheless, complementing individual supervision with group supervision and cohort activities proved beneficial, offering a theoretically grounded basis for designing more scalable supervision arrangements.

Editors

Section: Curriculum and
Assessment Design
Senior Editor: Alison Purvis

Publication

Submission: 25 November 2024
Revised: 5 November 2025
Accepted: 26 May 2026
Online First: 10 July 2026

Copyright © by the authors, in
its year of first publication. This
publication is an open access
publication under the Creative
Commons Attribution [CC BY-ND](https://creativecommons.org/licenses/by-nd/4.0/)

Practitioner Notes

1. The thesis finalisation self-efficacy framework can be used as a practical tool to structure supervision activities that build students' belief in their ability to complete a thesis.
2. Combining individual supervision with preparatory cohort and group supervision activities can enhance graduation rates and improve students' thesis-writing experience without compromising thesis quality.
3. The proposed supervision model increases efficiency by saving supervisors' time and enabling more focused feedback on thesis drafts.
4. The successful implementation of the proposed model requires consideration of the readiness and skill set of both supervisors and students.
5. Dedicated leadership, administrative support, programme alignment and responsiveness to contemporary developments in academic writing are critical for the effective adoption of the model.

Keywords

undergraduate thesis, group supervision, self-efficacy, design research

Citation:

Laidroo, L., & Vanari, K. (2026). Designing a thesis supervision model: Combining individual, group and cohort activities to support thesis finalisation self-efficacy. *Journal of University Teaching and Learning Practice*, 23(3).
<https://doi.org/10.53761/kqwc4728>

Introduction

The final year of undergraduate study programmes often includes either a more academically oriented graduation or honours thesis, the focus of this paper, or a more practically oriented capstone or consultation project (Healey et al., 2013). Their finalisation is problematic for students, supervisors and higher education institutions. Undergraduate students often find theses challenging (Schermer & Gray, 2012). Many of them experience difficulties with the independence required for their topic selection and execution when transitioning from directed to autonomous learning (Day & Bobeva, 2007). These issues are exacerbated by limited research skills (Erbay Çetinkaya & Yılmaz, 2017; Todd et al., 2004), limited time to develop them compared to graduate and postgraduate students (Stappenbelt & Basu, 2019) and writing activities that require strong self-regulation (Zimmerman & Kitsantas, 2007). These factors may lead students to doubt their ability to finalise the thesis and seek supervisor support (Todd et al., 2004). Supervisors' failure to provide sufficient support can reduce students' thesis writing motivation (Kryshko et al., 2020), thesis writing satisfaction (Del Río et al., 2017) and grades (Pasco-Dalla-Porta et al., 2024; Strebel et al., 2021). It may also lead to delayed thesis finalisation or withdrawal from studies (Herbas-Torrico et al., 2024).

For academics, undergraduate thesis supervision is one of many demanding tasks they must fulfil (Wolf, 2018) that may appear less rewarding for their research purposes compared to supervising graduate and postgraduate students (Kiley et al., 2011). They may also feel “uncomfortable” supervising undergraduates due to insufficient supervision training or a lack of interest in student-selected topics (Todd et al., 2006). For universities, supervising undergraduate theses becomes problematic in larger student cohorts (Todd et al., 2004). If budgetary constraints limit the possibilities to tackle increasing supervision load (Estermann & Pruvot, 2014) and supervision appears “expensive”, graduation theses may be abandoned despite their significance to students' learning (Todd et al., 2004). Such tendencies are amplified if completion rates remain tied to performance metrics used for determining an institution's funding (Larocca & Carr, 2020) or to external quality assurance, as is the case in most universities in Europe (Parveva et al., 2022).

Thesis supervision models must be carefully designed to overcome the challenges mentioned above. As commonly preferred individual supervision models are more appropriate for more advanced graduate and postgraduate students (Manathunga & Goozée, 2007), several attempts exist for the introduction of pure group supervision in undergraduate contexts (e.g., Akister et al., 2009; Fagevik Olsén & Bjerså, 2017; Niclasen & Strøbæk, 2019; Robson, 2022). Although group supervision enhances the efficiency of thesis supervision and allows peer support (Robson, 2022), it may not provide sufficient individual support (Fagevik Olsén & Bjerså, 2017; Robson, 2022) and emotional safety (Niclasen & Strøbæk, 2019). Therefore, combining individual and group supervision enables balancing their drawbacks (e.g., Baker et al., 2014; Dautel, 2020; Jaldemark & Lindberg, 2013; Niclasen & Strøbæk, 2019; Scholefield & Cox, 2016). However, existing studies either fail to provide any theoretical reasoning for the combined supervision model (e.g., Jaldemark & Lindberg, 2013; Scholefield & Cox, 2016) or the selected theoretical approach guides only the design of group supervision activities (e.g., Baker et al., 2014; Dautel, 2020; Niclasen & Strøbæk, 2019). The above-mentioned studies also fail to empirically compare the impact of various supervision activities on student progression, thereby hindering the development of more efficient supervision models.

Self-efficacy theory (Bandura, 1977) offers a theoretical lens for addressing these gaps in the literature because self-efficacy is an important determinant of academic outcomes (Honicke & Broadbent, 2016). As self-efficacy also plays a significant role in determining undergraduate thesis outcomes (Medaille et al., 2022), we introduce the concept of thesis finalisation self-efficacy (hereafter, TFSE) and connect it with the performance model of social cognitive career theory (Lent et al., 1994).

As in many European countries, in Estonia, 3-year bachelor's programmes typically end with the undergraduate thesis. Since timely graduation is important for many European higher education institutions and the funding of public Estonian universities is directly tied to graduation within the nominal study period, we explore the application of the TFSE-supporting supervision model within an undergraduate business administration programme at a public university in Estonia over four semesters.

We sought answers to the following research questions.

RQ1: Which supervision activities support students' TFSE more strongly?

RQ2: How do the supervision model's components (preparatory cohort activities, group supervision, individual supervision) support students' TFSE?

RQ3: What are the outcomes of the implementation of the TFSE-supporting supervision model?

Through answering these research questions, the study offers a transferable supervision design principle to link supervision activities to self-efficacy.

Literature

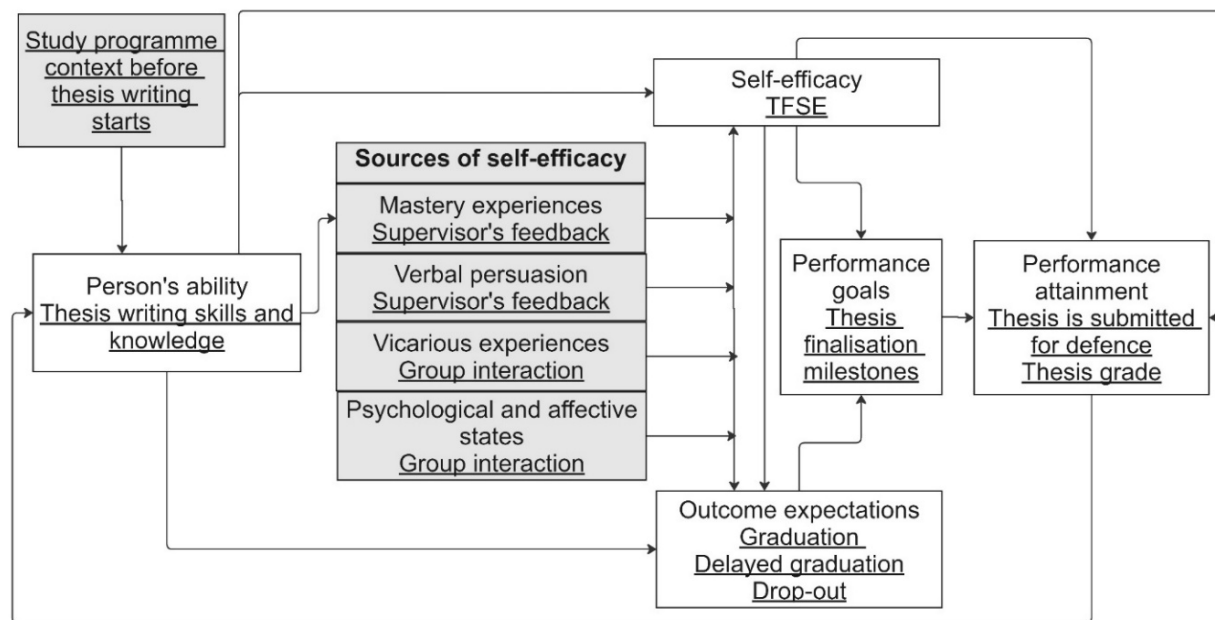
Thesis finalisation requires the application of various academic competencies, which can often appear overwhelming to undergraduate students (Medaille et al., 2022). This connects thesis writing to self-efficacy, which represents the student's belief in his/her ability to execute a given task (Bandura, 1977). Self-efficacy has received significant attention in research as an important determinant of educational performance (Honicke & Broadbent, 2016; Ng et al., 2025). However, its role in undergraduate thesis performance has been in the background (Medaille et al., 2022). In this paper, we use the term "thesis finalisation self-efficacy" (TFSE) to capture the belief in one's ability to apply all relevant skills needed for successful thesis finalisation. Our TFSE concept concentrates on individual-level self-efficacy, distinct from collective self-efficacy, which focuses on shared beliefs within a group (Bandura, 2000). TFSE is connected to, but distinct from, academic, research, and writing self-efficacy, which have been previously explored in the literature.

Academic self-efficacy encompasses the belief in one's ability to perform successfully in various academic tasks and is moderately correlated with academic performance (Honicke & Broadbent, 2016). Research self-efficacy refers to beliefs in one's ability to complete research tasks (Bieschke, 2006), and it has been shown to predict undergraduate students' interest in engaging in research (Hill et al., 2022). Writing self-efficacy encompasses the quality of writing, as measured through grammar, composition, idea development, and mechanical writing skills (Pajares et al., 2001), and is positively associated with grades of both undergraduate and graduate writing tasks (Mendoza et al., 2023; Prat-Sala & Redford, 2012). TFSE differs from each of these in that it has a narrower focus on thesis finalisation as a specific task, a greater emotional

load, and a greater emphasis on outcomes over skills and processes. Writing self-efficacy can be considered a sub-component of TFSE, as thesis finalisation additionally encompasses time management, formatting, submission, and staying motivated.

Figure 1

TFSE Conceptualisation (Authors' modification of Lent et al. (1994))



We conceptualise TFSE in Figure 1 using the performance model of social cognitive career theory (Lent et al., 1994), which allows us to link self-efficacy to eventual performance attainment. This model has previously been used to investigate the impact of self-efficacy on academic performance (Richardson et al., 2012) and university graduation (Bolkan et al., 2021). It maps naturally onto thesis supervision, given that performance attainment can be measured by successful thesis finalisation or grade. The model's original components are marked in white text boxes. As this model is based on self-efficacy theory (Bandura, 1977), we include the sources of self-efficacy in grey text boxes. Aspects relevant to thesis finalisation are presented as underlined text.

The study programme and thesis seminar courses affect students' thesis finalisation abilities (Engel, 2016; Piekart-Primiano et al., 2017). The evaluation of these abilities forms the basis for self-efficacy (in our model, TFSE) and outcome expectations (encompassing graduation, delayed graduation and drop-out in our model). Based on meta-analytic evidence from Lent and Brown (2019), both self-efficacy and outcome expectations are influenced by the four sources of self-efficacy (Bandura, 1977): mastery experiences, verbal persuasion, vicarious experiences, and psychological and affective states.

Mastery experiences capture personal accomplishments, and their positive impact on self-efficacy increases with successes, with greater belief in one's capabilities and when achieving more ambitious aims independently (Bandura, 1997). Such experiences facilitate thesis writing (Medaille et al., 2022) and are shaped by the supervisor's iterative and task-specific feedback (Mitchell et al., 2023). Constructive feedback from the supervisor, whether written or in person,

that acknowledges the student's thesis progress or improvements, supports the transformation of achievement into mastery experiences. The addition of milestones facilitates this process by creating more opportunities for experiencing success. As mastery experiences are based on comparisons with previous skills, this component is directly tied to a person's ability.

Verbal persuasion arises from being persuaded that the task is easier than it seems and can be performed successfully (Bandura, 1977). In the thesis setting, this is carried out by a supervisor through various forms of feedback. As persuasiveness depends on the credibility of its source (Bandura, 1997), the supervisor's credibility is strengthened by a closer connection between the supervisor and the supervisee (Strebel et al., 2021). Vicarious experiences are formed through interaction with peers, with success experiences of more similar peers supporting self-efficacy more strongly (Bandura, 1997). This suggests that an undergraduate student observing co-students working on their thesis and overcoming similar obstacles supports their TFSE. Involvement of peers is easier to establish in supervision groups (Baker et al., 2014; Dautel, 2020; Medaille et al., 2022), where such experiences can be easily shared (e.g., through progress roundtables, observing feedback provided to peers, or peer review).

Psychological and affective states most strongly impact self-efficacy when emotions are intense, with positive emotions increasing self-efficacy and negative emotions decreasing it (Bandura, 1997). As writing an undergraduate thesis often occurs under time pressure and is accompanied by stress reactions (Medaille et al., 2022), sharing emotions in groups can support TFSE. Self-efficacy and outcome expectations are used to formulate performance goals (Bandura, 1994) that can take the form of different thesis finalisation milestones (e.g., topic selection, literature review, data collection). Fulfilment of performance goals leads to performance attainment (Lent & Brown, 2019), which can take the form of persistence (e.g., submitting a thesis for defence) or level of accomplishment (e.g., thesis grade).

The main limitation of our TFSE concept is the omission of collective self-efficacy (Bandura, 2000). As thesis writing is typically independent and assessed individually, individual-level TFSE would likely dominate, with collective self-efficacy serving as a context that may reinforce individual TFSE. TFSE remains highly task- and context-specific and dynamic, constantly changing throughout the thesis writing process as feedback is obtained and progress is compared to that of peers. We have used the TFSE concept depicted in Figure 1 to develop a TFSE-supporting undergraduate thesis supervision model. The details of the model are presented in the following Procedure section.

Method

Research Design

This study aimed to improve routine educational practice through design research using a mixed-methods approach that combined quantitative and qualitative data. It posed minimal risk to adult participants and was conducted in accordance with the university's ethical guidelines at the time of initiation in 2021. Under these guidelines, formal ethics approval was not required. We acknowledge, however, that according to contemporary research standards, this study would typically require formal ethics approval. As such approval cannot be obtained retroactively, we identify this as a limitation and address each of the ethical standards outlined by Purvis and Crawford (2024) in turn.

In line with Principle 1, independent ethical scrutiny was provided by one independent researcher working at the same institution prior to data collection, using the Estonian Code of Conduct for Research Integrity as the agreed basis for review. The research protocol outlined the steps to be taken, along with the interview guides and survey templates for the first semester. All changes introduced to the initial research protocol afterwards were discussed with the independent researcher at the end of each design research iteration and prior to their implementation. The protocol was documented in sufficient detail to ensure methodological transparency and support replicability (Principle 4).

In line with Principle 2, the risks and benefits of the study were weighed before the start. The earlier supervision model had become unsuitable for rapidly increasing student cohorts, leading some students to be unable to graduate due to a lack of a supervisor. In contrast, those with supervisors tended to postpone writing until the last minute. The benefits arising from implementing the new model, therefore, clearly outweighed the risks. To minimise risks, students and supervisors were informed in advance, invited to provide input, and engaged through regular data collection to track progress. Voluntary student meetings and regular discussions with supervisors were held to identify potential risks and develop mitigation strategies.

In line with Principle 3, special attention was paid to the power dynamics between the first author (who served simultaneously as a leader, supervisor and researcher). Students were explicitly informed that their responses would not in any way influence the support they personally received, and that mentioning problems would help improve support provided for all students. Efforts were made throughout to ensure voluntary participation and open feedback.

In line with Principle 5, all participants were assured that data gathered would be used only in a fully pseudonymised form. Identifiable data were available only to the first author during the model implementation period. Interview transcripts included only pseudonyms, and student surveys used only student codes. Student codes and supervisor names were replaced with researcher-generated participant-specific numbers prior to analysis, and initial response files were deleted after pseudonymisation. All data files were stored securely on an institutional network accessible only to the first author.

In line with Principle 6, informed consent was obtained from all interviewees and survey respondents before data collection. They were informed of the study's aim, the first author's triple roles in the process, the financial support from the institution, and the high likelihood of publication. The voluntary nature of their participation and the possibility of withdrawing at any time were emphasised throughout. As these aspects were also discussed during the first meetings with participants, no questions or concerns were raised afterwards.

With the ethical basis of the study established, we turn to the design rationale. To address existing shortcomings and adapt to the sudden increase in student numbers, a new TFSE-supporting supervision model was necessary. Its development and subsequent improvements were based on design research led by the first author. This approach was chosen for its ability to address complex real-world problems flexibly through reflective inquiry, iterative improvement, and mixed methods, while contributing to theory construction in educational settings (Reeves et al., 2005). While traditional research might test an existing supervision theory, we aimed to simultaneously refine the TFSE-supporting supervision model as an institutional change and generate contextually grounded design principles explaining why and how certain combinations of

individual and group supervision activities affect TFSE in complex academic environments. While the implementation of design research inevitably introduces several conceptual, methodological, communicative, and political complexities (McKenney & Reeves, 2021), the value of this approach lies not in these inherent challenges but in the rigour of its realisation.

The preparatory stage, from October 2021 to February 2022, involved problem identification, a literature review, and discussions with supervisors, administrators, and students, with the supervision model prototype being introduced in the spring of 2022. During the four design research implementation stages from the 2022 spring to the 2023 autumn semester, the model was gradually refined based on data and participant input (for further details, see Laidroo, 2024).

Participants

Over the four semesters, all 124 students in the same major of the undergraduate programme and intending to graduate participated in implementing the new supervision model, with no exclusion criteria applied. As students failing to graduate in one semester re-entered the thesis-writing process in subsequent semesters, some students appear repeatedly in the data. All supervisors of students in the same major also participated. Their number varied from five to eight per semester, including the first author, depending on how many students required supervision.

Measures

Three key concepts required measurement across the three research questions: perceived TFSE support from specific supervision activities (RQ1 and RQ2) and performance attainment outcomes (RQ3). Most data were collected through semi-structured interviews and online surveys, which included both multiple-choice and open-ended questions. Open-ended questions were phrased reflectively to reduce the potential impact of self-report bias.

Interviews were conducted at two points during the study (see Procedure), comprising 12 individual interviews with all participating supervisors, lasting up to an hour, and 4 group interviews with a total of 13 students, each lasting 1 to 1.5 hours. Interview groups were formed based on volunteering students' availability. In three groups, both those who finalised and those who failed to finalise their thesis were represented. Interviews were based on a plan analysed by one independent researcher and piloted during the first interview. Interviews focused on participants' reflections on supervision model functioning (e.g., "Where did the usefulness of the joint meetings at the beginning of the semester lie for completing your thesis?"). To increase participation, interviews were conducted via MS Teams and recorded.

Six survey templates were created and administered at points described under Procedure. Four gathered input from all students: two after group meetings and two at the end of the semester, using separate templates for graduates and drop-outs. Two surveys gathered input from all supervisors, with 100% response rates. Response rates for student after-group-meeting surveys ranged from 31 to 70% (mean 57%), and for the end-of-semester surveys, from 56 to 92% (mean 80%). More detailed information on surveys can be found in Laidroo (2024). The lowest response rate occurred at the last meeting, where no reminders were sent, as this was considered detrimental to students' progression and emotional well-being. We acknowledge that nonresponse bias affected those who failed to graduate more strongly. However, this was mitigated by using multiple surveys at various stages of thesis writing and by complementing survey responses with interviews.

In the within-semester surveys, both students and supervisors evaluated the extent to which each group meeting supported students' thesis finalisation on a scale from 1 ("did not support at all") to 5 ("supported strongly") and rated their after-meeting emotions on a scale from 0 (negative) to 10 (positive). Students also reflected on group interactions outside of group meetings and thesis writing progress through open-ended questions. End-of-semester surveys gathered broader reflections on the supervision model from supervisors. To answer RQ1, the end-of-semester survey asked students to evaluate each supervision activity on the same 1 to 5 scale. The responses are presented in Table 1.

Performance attainment for RQ3 was measured by the number of students and submitted theses from Moodle, grades from the student information system, and thesis quality indicators manually collected from the thesis documents, including the number of academic sources used and the difficulty level of the research method.

To the authors' knowledge, no valid instruments exist for measuring TFSE among undergraduate students. Existing instruments for writing self-efficacy (Prat-Sala & Redford, 2010) or research self-efficacy (Jones et al., 2024; Shaw et al., 2013) would have required substantial adaptation to capture TFSE. A simple, context-specific, unstandardised instrument was, therefore, deemed sufficient for the design research purposes, supported by design research's pragmatic stance that favours approaches suited to addressing practical problems (Gillespie et al., 2024; Wang & Hannafin, 2005). We acknowledge that the lack of a validated instrument limits our ability to assess TFSE in a standardised manner. Consequently, our findings should be interpreted as indicative of perceived support for TFSE.

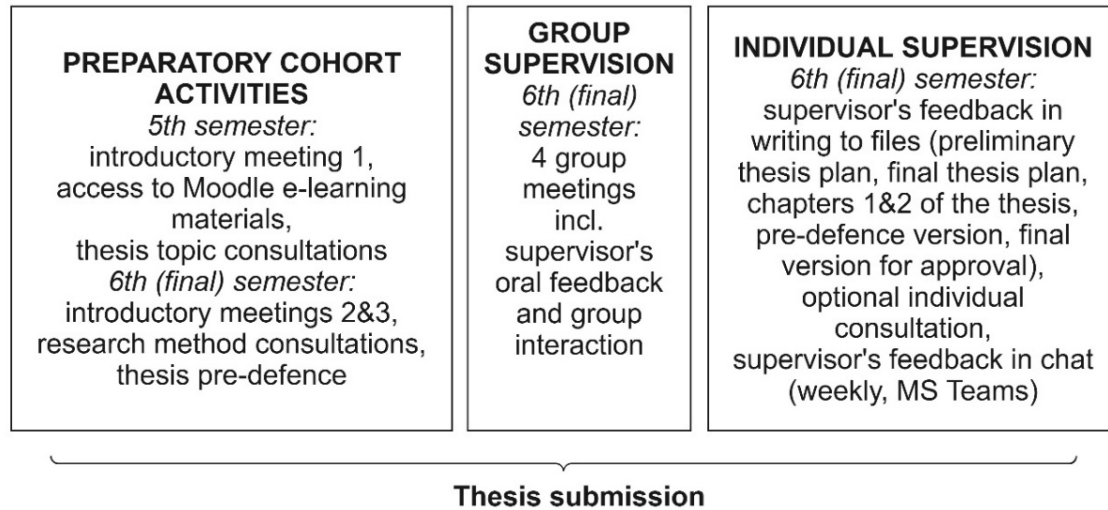
Procedure

In a given 3-year business administration programme in Estonia targeting only domestic students, the undergraduate thesis is required to obtain a bachelor's degree. The thesis focuses on a theoretical or practical problem, freely chosen and independently finalised by the student under the supervisor's guidance. Before the 2022 spring semester, the individual supervision format required students to find a supervisor among the faculty during the final (6th) semester. No thesis seminar course existed, and there were only three milestones: topic registration, submission of the thesis plan, and submission of the thesis for the final defence.

By autumn 2023, the model had taken the form depicted in Figure 2. It comprises three components: preparatory cohort activities in the 5th and 6th semesters, and group and individual supervision, both conducted only in the 6th semester and populated with a range of mandatory and optional activities.

Figure 2

Components and Activities in the Supervision Model



Preparatory cohort activities were added to enhance students' preparation for thesis writing through a thesis seminar course addressing the abilities component of our conceptualisation. In the 5th semester, it included an introductory meeting 1 on thesis requirements, followed by access to e-learning materials and thesis topic consultations. At the start of the 6th semester, it included introductory meetings 2 and 3. In the second half of the 6th semester, it contained a group consultation on research methods and thesis pre-defence. Pre-defence and intermediate deadlines were set to develop mastery experiences.

The group supervision component was added to target verbal persuasion, vicarious experiences, and stress reactions. Groups of four to ten students were formed based on students' topic preferences, and each group met with their assigned supervisor four times during the final semester. The individual supervision component was modified to require students to submit thesis plans and drafts to Moodle for written supervisor feedback. MS Teams chat-based questions and additional individual consultations, limited to 60 minutes per semester, were available as additional support. This component was expected to support TFSE through mastery experiences and verbal persuasion.

Interviews were conducted at the end of the spring and autumn semesters of 2022. Surveys were administered to students after each group meeting and at the end of each semester in 2022 and 2023, and to supervisors after each group meeting in 2022 and at the end of each semester in 2023. At the end of each semester, findings were reviewed, and any modifications to the model or data collection protocol were agreed upon with the independent researcher before the next implementation stage, ensuring consistency and transparency across iterations.

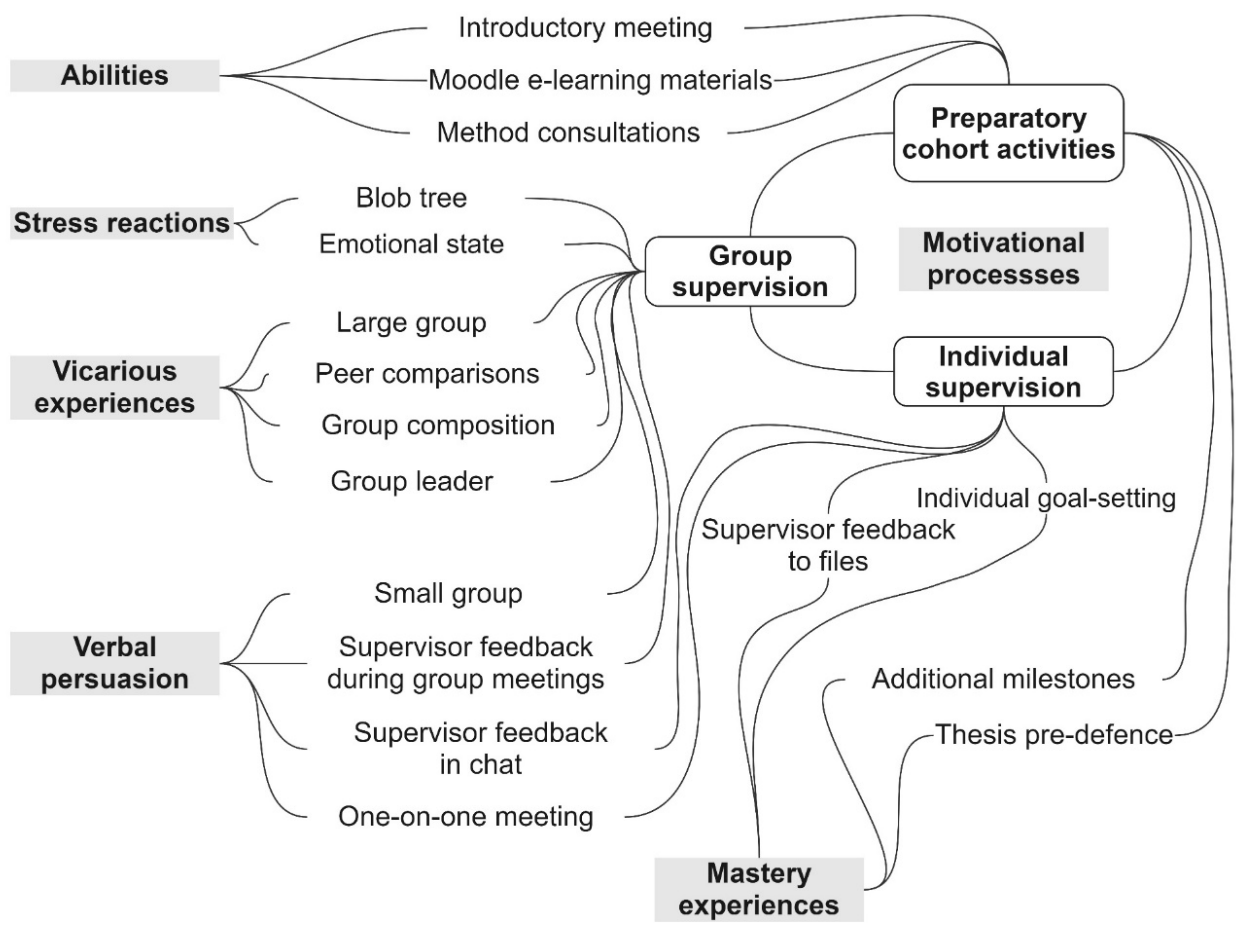
Analysis

Different analysis methods were employed. To answer RQ1, the Kruskal-Wallis test was used to determine the differences in evaluations of self-efficacy in supporting supervision activities, as reported in end-of-semester student surveys.

To answer RQ2, qualitative content analysis, following Mayring (2022), was employed on the interview transcripts of students and supervisors generated using the Estonian speech recognition system (Olev & Alumäe, 2022), as well as on open-ended survey responses. An inductive approach was employed to form the initial categories based on the last group interview conducted in January 2023, after which, a deductive approach grouped categories relevant to RQ2 by self-efficacy sources (Bandura, 1977) and linked them to supervision model components. The categorisation was adjusted after investigating the text fragments under each category, adding some new ones and eliminating others. The final coding frame, presented in Figure 3, shows the supervision model components in textboxes with curved corners, with final categories linked to these as text outside the boxes (without any background colour). TFSE sources and other relevant parts of the model are highlighted in grey. Open-ended survey responses were analysed using the same coding frame. Triangulating survey responses with interview data reduced desirability, selection, and groupthink biases.

Figure 3

Coding Frame for RQ2



The first author of the paper performed the coding to benefit from the coder's expertise in the design research process. Multiple coders were not used due to resource constraints. To ensure trustworthiness and consistency, and to reduce interpretative variability, a thorough coding

manual was created through the iterative refinement of categories and used consistently. Credibility and confirmability were enhanced by coding the interviews a year after the last one and surveys after the finalisation of the last one.

To answer RQ3, descriptive statistics were calculated based on input from the e-learning environment, student information system and theses. In addition, aspects covering students' and supervisors' outcome-linked incentives were extracted from interviews and open-ended survey responses through qualitative content analysis.

The primary reflexivity concern is the first author's triple roles: leading the supervision model change, supervising students, and conducting empirical research. To reduce the risk of role conflict, research activities during the implementation period were confined to data collection and monitoring, with in-depth analysis conducted after the final implementation stage using fully pseudonymised data. The final interpretation of the results involved the second author. To further minimise analytical bias, findings were shared and discussed with all supervisors to validate the evidence and conclusions at each semester. Some relevant findings were discussed during student interviews to gather their reflections. To minimise the impact of role confusion during interviews, the first author followed pre-specified, piloted interview plans, aiming to remain a neutral listener. To reduce social desirability bias, the confidentiality of participants' responses was emphasised throughout, and the use of online surveys reduced the pressure of face-to-face interaction.

Results

Supervision Activities and TFSE

The answer to RQ1 is based on students' evaluations of supervision activities' contribution to their thesis finalisation (Table 1). Evaluations across activities were significantly different in all periods. The pair-wise analysis across the entire period indicates that group interaction outside of group meetings was perceived as significantly less TFSE-supportive than group meetings, introductory meetings, and supervisors' feedback via chats or files. Nearly a third of respondents reported no communication outside of the group meetings. Introductory meetings 1 and 3 were perceived as significantly less supportive than group meetings, and Introductory meeting 3 was less supportive than all forms of supervisor feedback. Across semesters, only the evaluation of group interaction between students outside of group meetings in the 2023 spring semester exceeded significantly that in the 2022 spring semester. As the differences in evaluations of activities with means over four were not significant, a substantial positive impact on TFSE was perceived to arise simultaneously from group meetings (linked to vicarious experiences), supervisor feedback to files (linked to mastery experiences) and supervisor feedback during group meetings (associated with verbal persuasion). Somewhat lower support was perceived from preparatory cohort activities (targeting students' abilities).

Table 1*Students' Evaluations of Perceived TFSE Support*

Supervision activity	Mean (95% confidence interval)					K-W p across semesters
	2022S	2022A	K-W p across semesters	K-W p across semesters	Entire period	
Introductory meeting 1	-	-	3.55 (3.13, 3.97)	-	3.55 (3.13, 3.97)	-
Introductory meeting 2	3.74 (3.51, 3.97)	3.71 (3.1, 4.33)	3.64 (3.29, 4.00)	4.08 (3.78, 4.38)	3.75 (3.59, 3.92)	.471
Introductory meeting 3	3.45 (3.14, 3.75)	-	3.66 (3.32, 3.99)	-	3.54 (3.32, 3.76)	.184
Video viewing	-	3.60 (3.07, 4.13)	4.50 (3.99, 5.01)	4.00 (3.55, 4.45)	3.94 (3.64, 4.23)	.079
Research method consultations	-	4.50 (2.91, 6.09)	3.44 (2.80, 4.09)	3.13 (2.43, 3.82)	3.50 (3.05, 3.95)	.122
Supervisor's feedback in writing to files	4.10 (3.84, 4.36)	4.32 (3.99, 4.64)	4.00 (3.65, 4.35)	4.20 (3.53, 4.87)	4.11 (3.94, 4.29)	.746
Supervisor's feedback in chat	3.70 (3.36, 4.04)	3.31 (2.74, 3.89)	4.13 (3.78, 4.48)	4.08 (3.36, 4.79)	3.81 (3.6, 4.03)	.053
Supervisor's feedback during group meetings	4.09 (3.84, 4.34)	4.11 (3.72, 4.5)	4.19 (3.91, 4.47)	4.40 (3.82, 4.98)	4.16 (4.01, 4.32)	.350
Group meetings 1 to 3	4.04 (3.77, 4.31)	4.16 (3.92, 4.40)	4.38 (4.16, 4.59)	4.44 (4.10, 4.77)	4.23 (4.09, 4.36)	.151
Group meeting 4	-	4.09 (3.73, 4.45)	4.31 (3.92, 4.70)	4.25 (3.28, 5.22)	4.24 (3.97, 4.52)	.355
Interaction outside the group meetings	2.59 (2.23, 2.96)	3.11 (2.55, 3.67)	3.59 (3.24, 3.93)	2.93 (2.10, 3.76)	3.09 (2.86, 3.32)	.003
K-W p across activities	<.001	.001	<.001	.003	<.001	
Total responses	55	20	46	18	139	

Note. Evaluation scale from 1 ("did not support at all") to 5 ("supported strongly"). Missing responses are marked with "-". Semester: S – spring, A – autumn. K-W p – Kruskal-Wallis p-value

Supervision Model Components and TFSE

In line with RQ2, the following sub-sections present the perceived support derived from each supervision model component for TFSE.

Preparatory Cohort Activities

Although perceived as less supportive than other activities (Table 1), preparatory cohort activities appeared to support thesis finalisation by improving students' abilities. Students indicated during group interviews that the introductory meetings helped them set goals and served as a wake-up call. Several interviewed students admitted to repeatedly watching e-learning videos on topics they were struggling with. Interviewed supervisors confirmed that e-learning materials improved students' awareness of the thesis writing technicalities and reduced the time they spent explaining them.

Students who participated in research method consultations found them beneficial, and concerns about research methods declined during the semester for 44% of survey respondents. Still, 26% reported difficulties with methods, and 10% would have preferred more consultations.

Despite the addition of milestones, students in the survey and in two group interviews indicated that even more milestones should be provided.

There should be more such intermediate stages, more mandatory deadlines. Inevitably, most things still fall on the last deadline, so to speak, and the more such deadlines exist, the greater the hope is that things will go more smoothly in smaller bites. (Student 1, Group 4)

Students interviewed in Group 4, and one survey respondent indicated that pre-defence allowed them to better prepare for the final defence. Three interviewed supervisors confirmed that it had enabled supervisees to identify ways of improving their theses.

Group Supervision

Group supervision activities were perceived as strongly supporting TFSE through vicarious experiences and verbal persuasion (Table 1). Both interviewed students and supervisors indicated that groups needed to be sufficiently large to allow vicarious experiences while remaining small enough to support verbal persuasion, with "ideal" size between four and six. Survey responses indicated that 6% of students saw the most significant value of group meetings in the peer comparisons. Several admitted to pushing harder when behind others or realising that their thesis progress was not comparatively worse. "I thought I was behind schedule, but it turned out I was doing well compared to others." (Student 2)

Interviewed supervisors observed that vicarious experiences depended on group composition, having a greater impact when topics and methods were similar, when students had less individualistic attitudes, or when any student took a leadership role. If these conditions were not met, group meetings could turn into a dialogue between the supervisor and a single student. Seven students reported in survey responses that they "wasted" time at group meetings. A third of students indicated that greater group interaction would have supported their progress, though this remained challenging as 2/3 lacked time to work on their thesis. Several interviewed supervisors noted that the concentration of students who had failed to graduate in previous semesters had to remain sufficiently small to avoid adverse peer effects.

Verbal persuasion through oral supervisor feedback during group meetings was highly valued by over half of responding students, who reported it enabled them to verify their direction, ask questions, and determine the next steps.

Regarding stress reactions, the mean emotional state score after group meetings was above 8 in all four semesters. Several interviewed students reported that group meetings reduced their anxiety. “It became much, much clearer what my next steps are, what I have to do and what is required of me. I got rid of anxiety.” (Student 4) Some admitted to receiving a motivational boost, with one student appreciating the possibility of discussing their feelings in the group. Students’ survey responses also showed positive motivational effects when group members were engaged, and the supervisor appeared supportive.

Individual Supervision

Individual supervision was perceived to significantly support mastery experiences through written feedback on thesis plans and drafts (Table 1). Some students indicated in their survey responses that they would have preferred more detailed feedback. Some interviewed supervisors reported using individual goal setting for students progressing at a different pace. Although students had the option of up to 60 minutes of individual consultation and weekly chat access, supervisors reported that these were rarely used.

Outcomes of the TFSE-supporting Supervision Model

In line with RQ3, Table 2 presents the main performance attainment indicators.

Table 2

Thesis Outcomes before and after the Implementation of the New Supervision Model

	Spring semester			Autumn semester		
	2021 old model	2022 new model	2023 new model	2021 old model	2022 new model	2023 new model
Number of graduates	25	39	42	7	12	12
Thesis completion rate	55%	65%	71%	27%	48%	60%
Mean thesis grade	3.46	3.43	3.57	3.14	3.5	3.41
Mean number of used academic sources	13.08	17.08	18.76	11.14	18.83	17.92
% of theses using complex methods	52%	64%	76%	28%	75%	75%

The proportion of students intending to graduate in a given semester increased by 16 to 33 percentage points following the introduction of the new supervision model compared to 2021. This increase did not come at the expense of thesis quality, as the mean number of academic sources used increased by four to seven sources on average, corresponding to an over 30% increase. Also, the proportion of theses employing more demanding research methods (e.g., event studies, time-series econometrics, regression models) increased by 24 to 47 percentage points. The

improvements were more pronounced in the autumn semester. Students meeting the nominal study period requirements should graduate in the spring, and students graduating in autumn have usually struggled to finalise their thesis in the spring.

Some students participating in the study had either prior personal experience of failing to finalise their thesis or had heard of others' experiences. During the group interview, they indicated that the new supervision model eliminated the need to search for a supervisor, which had previously been the first obstacle. Others, with no such experience, claimed that the supervisor assignment may have negative motivational implications if they get the "wrong" supervisor. Some students with negative prior experiences with individual supervision indicated in the survey that they valued highly the improvements that group meetings had brought to their thesis writing experience, allowing for more regular communication with the supervisor and the possibility of sharing experiences with peers. Several students used the survey field for other remarks to express their satisfaction (none used it to add negative comments).

In general, I really liked such structure of the thesis writing process. It helped me stay on track, and I knew I was not alone. I always got answers at group meetings, after which I was always in a very good mood and motivated to continue writing the thesis. (Student 5)

Interviewed supervisors indicated that they strongly benefited from the supervisor assignment, as they did not have to respond to numerous email enquiries in the supervisor search phase. The new model reduced supervision time by up to two times compared to the individual supervision setup. A somewhat greater timesaving was also reported in the autumn semester, as most students had completed their topic selection and prepared the thesis plan in the spring.

Although our analysis period ended in 2023 autumn, the TFSE-supporting supervision model has continued to be used since then, with no further modifications introduced. Routine programme records, monitored for administrative purposes (outside the analysed dataset), show that up to 2026 January, the thesis completion rates have remained stable in the spring semester (between 66-72%) and more volatile in the autumn semester (between 31-50%). The drop to 31% in the 2025 autumn appears attributable primarily to a pile-up of students who had failed to graduate for several semesters in a row (some of whom started in the 2022 spring).

Discussion

Across all three questions, the results support the value of combining individual supervision with group and cohort activities, while confirming the theoretical relevance of TFSE as a concept.

Supervision Activities and TFSE

Addressing RQ1, the finding that group meetings, supervisor feedback to files, and supervisor feedback during group meetings were all perceived as similarly strongly TFSE-supportive, was somewhat unexpected. While the high perceived value of group supervision aligns with Baker et al. (2014), based on Lent and Brown (2019), a more pronounced positive impact of mastery experiences followed by verbal persuasion and vicarious experiences would have been expected. This may reflect the use of unstandardised survey instruments rather than genuine equivalence of impact across self-efficacy sources.

Supervision Model Components and TFSE

We address RQ2 by covering preparatory cohort activities, group supervision and individual supervision in turn.

Preparatory cohort activities delivered through a thesis seminar course were perceived as less strongly supportive than other activities, yet they did support thesis finalisation by improving students' abilities, consistent with Engel (2016). However, they may not be sufficient to achieve methodological maturity. As method-related difficulties often remain obstacles to thesis finalisation (Erbay Çetinkaya & Yılmaz, 2017; Strebel et al., 2021) and their mastery requires more time, further attention to methodology at the study programme level is needed. Some students also found the additional milestones within the thesis seminar course insufficient. Although more milestones support mastery experiences (Engel, 2016; Medaille et al., 2022), having too many may hamper the development of self-regulation skills (Wisker, 2018), making blanket additions counterintuitive. Personally tailored milestones, however, may better serve students progressing at different paces. By contrast, the pre-defence component proved an effective vehicle for creating mastery experiences, which have been shown to influence thesis outcomes positively (Pasco-Dalla-Porta et al., 2024).

Turning to group supervision, group meetings were perceived to have a positive impact on TFSE through vicarious experiences, confirming findings from Baker et al. (2014) and Niclasen and Strøbæk (2019). This also supports the positive impact of collective self-efficacy on individual-level TFSE (Bandura, 2000). As noted previously by Dautel (2020) and Scholefield and Cox (2016), vicarious experiences depend heavily on group composition. Specifically, an excessive concentration of students who had failed to graduate in previous semesters generated adverse peer effects, showing that collective self-efficacy can either support or undermine the individual-level TFSE, as also indicated by Nordentoft et al. (2013). Group size matters in this regard too, with our experience suggesting that four to six students are optimal, broadly consistent with the range of three to five suggested by Kangasniemi et al. (2011).

Group meetings enabled face-to-face verbal persuasion through supervisor feedback, as observed in other group supervision studies (Nordentoft et al., 2013; Robson, 2022), partially substituting for verbal persuasion obtained through individual supervision. They also enabled emotion-sharing, which supports emotional regulation (Kaakinen et al., 2017). Since failure to regulate emotions lowers writing self-efficacy (Martinez et al., 2011), group meetings appeared to have high potential to support TFSE, as shown by Miedijensky and Lichtinger (2016). Positive motivational effects emerged when group members were engaged and the supervisor appeared supportive, confirming Akister et al. (2009). While supervisor assignment carries some risk of motivational mismatch, under the previous arrangement, this risk was not appreciably lower.

Individual supervision was perceived as an important driver of mastery experiences through the supervisor's written feedback and reflective surveys. The finding that some students preferred more detailed feedback, alongside their use of reflective surveys after group meetings, aligns with evidence that both supervisor feedback and reflection support mastery experiences (Neupane Bastola & Hu, 2021; Van Dinther et al., 2011). At the same time, as also reported in Baker et al. (2014), the introduction of group supervision elements reduced verbal persuasion through individual consultations and chat. This may indicate that the need for individual supervision decreases when other supervision activities are added. Notably, Bandura (1997) observed that

less external help facilitates the development of mastery experiences, suggesting that lower levels of verbal persuasion through individual channels may not be automatically detrimental.

Outcomes of the TFSE-supporting Supervision Model

Addressing RQ3, the improvements in graduation rates confirm findings from previous studies focusing on the application of group supervision elements (Akister et al., 2009; Robson, 2022). The more pronounced improvements in the autumn semester indicate that the new model enabled significantly greater support for students who were struggling to finalise. The participants' feedback confirms the benefits of integrating group supervision elements into undergraduate supervision models (Dautel, 2020; Niclasen & Strøbæk, 2019; Scholefield & Cox, 2016) together with cohort activities in the form of thesis seminar courses (Medaille et al., 2022; Pasco-Dalla-Porta et al., 2024). The drop to 31% completion in the 2025 autumn illustrates the risk of negative peer effects when the proportion of newcomers in supervision groups falls too low. It also points to a broader institutional vulnerability in systems that do not limit the number of times a student can re-enter the thesis writing process.

The reduction in supervision time by up to 2 times aligns with the 45% decrease reported by Baker et al. (2014) and confirms the time savings arising from combining different supervisory activities (Dautel, 2020). As in Niclasen and Strøbæk (2019), greater time savings occurred in the initial phases of thesis writing.

Practical Implications

The implementation and outcomes of the proposed supervision model depend on several factors. First, supervisors' skill sets and their willingness to adjust their practices are important. Compared to individual supervision, group supervision is more demanding, requiring simultaneous attention to both content and interaction (Wichmann-Hansen et al., 2015) and consideration of group processes (Fagevik Olsén & Bjerså, 2017). For novice supervisors, the proposed setting may appear overwhelming, though the model may allow them to pair with more experienced supervisors to develop their skills. Second, leading the change in the supervision model requires a dedicated leader and sufficient administrative support. While the supervisors spent less time on supervision, someone had to ensure that the cohort activities were organised, student progress was monitored, and deadlines were followed. Third, it would be desirable for students to begin thesis preparation activities before their last semester. Fourth, the implementation must account for students' evolving readiness for group-based learning, given the growing importance of transferable skills in higher education (Succi & Canovi, 2020). Supervisors should be mindful of group dynamics, and cohort activities should draw students' attention to how the group setting can benefit their progression. Fifth, the specific contents of preparatory cohort activities require strong programme alignment to avoid unnecessary duplication while bridging knowledge and skill gaps. Additionally, students' needs for utilising AI in academic writing are shifting with rapid developments in AI, necessitating adjustments to the preparatory activities in the model.

Theoretical Implications

This paper's main conceptual contribution is the introduction of the TFSE concept as a specific form of individual-level self-efficacy grounded in self-efficacy theory (Bandura, 1977) and linked to performance attainment through a performance model of Lent et al. (1994). This allows for

translating self-efficacy theory into different TFSE-supporting undergraduate supervision model designs that link specific supervision arrangements with sources of self-efficacy and provide a theoretical lens for moving from individual undergraduate thesis supervision to more complex supervision arrangements. Unlike prior applications of self-efficacy theory in higher education, which have focused on broader academic (Honicke & Broadbent, 2016), research (Bieschke, 2006), or writing self-efficacy (Pajares et al., 2001), TFSE is the first task- and outcome-specific construct targeting the thesis finalisation context.

Limitations and Future Research

A central limitation concerns the transferability of the TFSE-supporting supervision model. Although Estonia participates in the European Higher Education Area, significant differences exist across higher education systems within Europe (European Commission/EACEA/Eurydice, 2024). Institutional funding has been tied to graduation rates in several countries besides Estonia (European Commission/EACEA/Eurydice, 2024; Jongbloed & Vossensteyn, 2016; Larocca & Carr, 2020); however, the lack of similar incentives may negatively influence adoption elsewhere. As the model was implemented within a single discipline, it may not be directly transferable to other disciplinary contexts. Future studies adopting similar models in other national and disciplinary contexts would provide further insights.

The model may require institution-specific fine-tuning of scheduling and supervision organisation, including adjustments to the number of milestones, deadlines, and the amount of preparatory cohort activities. In less resource-constrained environments, supervision groups could be slightly smaller, and students could take a more active role in peer feedback. More substantial modifications may be necessary outside the social sciences domain, as academic writing is discipline-oriented and shows greater differences across disciplines that are further apart (Dong et al., 2024). In economics/business, many thesis components are equally important. In contrast, in chemistry, the dominant component is the implications of results, and in biology, compelling argument development and goal articulation (Dowd et al., 2016). In engineering, writing is often considered a reporting activity following practical lab work (Winsor, 1990), suggesting that, in STEM (science, technology, engineering, mathematics) fields, milestones should align with lab timelines, group meetings should be designed around lab-group structures, and supervisor feedback should be oriented towards non-writing deliverables. In the humanities, where thesis writing emphasises reading and writing (MacDonald, 2010), preparatory cohort activities could focus more on argumentation and discourse conventions; group meetings could be tailored toward writing workshops with peer review; and milestones could be more frequent, with less prior student work required.

The proposed supervision model should be modified for more diverse student cohorts. Application within an international cohort requires consideration of differences in academic and social integration (Steele & Douglas, 2021), cultural background (Liu et al., 2022), and writing and language skills (Martirosyan et al., 2019). This involves reserving more time for preparatory activities and more formalised group supervision setups.

The measurement of TFSE remains indirect due to the use of unstandardised survey instruments. Developing a validated, multidimensional TFSE instrument would substantially strengthen future investigations.

We cannot rule out the possibility that reported improvements in thesis outcomes may be influenced by other factors unrelated to the new model. Data collection and analysis may remain somewhat vulnerable to desirability, selection, nonresponse bias, and self-reporting bias, and the trustworthiness could have been improved by using multiple coders. Future studies employing our TFSE-concept (see Figure 1) could consider cognitive, motivational, affective and selection processes (Bandura, 1994) as mediators between performance goals and performance attainment and attempt to measure their role in thesis finalisation.

Conclusions

This paper introduces the TFSE as a specific form of self-efficacy (Bandura, 1977) and links it to performance attainment through the performance model of Lent et al. (1994). This provides a theoretical lens for moving from individual undergraduate supervision to more complex supervision arrangements by linking preparatory cohort activities, group supervision, and individual supervision. One possible TFSE-supporting supervision design has been introduced and applied within an undergraduate business administration programme at a public university in Estonia.

The strongest perceived support for students' TFSE arose from vicarious experiences provided by group meetings, mastery experiences stemming from the supervisor's feedback on thesis plans and drafts, and verbal persuasion by the supervisor during group meetings. Although preparatory cohort activities and peer interactions outside group meetings had comparatively weaker impacts, combining different supervision activities proved beneficial, improving graduation rates and thesis-writing experience without decreasing thesis quality, while also enhancing supervision efficiency. These findings offer institutions a theoretically grounded basis for designing more scalable and supportive undergraduate thesis supervision models.

Acknowledgements

We appreciate the contributions of all supervisors and students who participated in implementing the new thesis supervision model. We also thank Anneli Kalm for providing a helping hand in implementing the project, as well as co-students and faculty at Tallinn University for their support and advice.

The authors disclose that they have no actual or perceived conflicts of interest. This work was supported by the Tallinn University of Technology under Grant SÕF22045 "Pilot project for combining individual supervision of bachelor's thesis with group supervision"; the institution had no role in the study design, data collection and analysis, decision to publish, or preparation of the manuscript. The authors confirm that they have met the ethical standards expected as per Purvis and Crawford (2024), as detailed in the Research Design section. The authors have used *Claude* (claude-sonnet-4-6), accessed via claude.ai, to support restructuring of the initial manuscript's full text (for following journal template requirements) and to support shortening it, and meet the expected principles as per Crawford et al. (2026).

The authors list the following CRediT contributions: **Laidroo**: conceptualisation, methodology, formal analysis, investigation, writing – original draft, visualisation, funding acquisition, project administration; **Vanari**: conceptualisation, writing – review & editing.

References

- Akister, J., Isabel, W., & Maynard, A. (2009). Group supervision of undergraduate dissertations: A preliminary enquiry into the student experience. *Practice and Evidence of the Scholarship of Teaching and Learning in Higher Education*, 4(2), 77-94.
<https://www.pestlhe.org/index.php/pestlhe/article/view/34>
- Baker, M.-J., Cluett, E., Ireland, L., Reading, S., & Rourke, S. (2014). Supervising undergraduate research: A collective approach utilising groupwork and peer support. *Nurse Education Today*, 34(4), 637-642. <https://doi.org/10.1016/j.nedt.2013.05.006>
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioural change. *Psychological Review*, 84(2), 191-215. <https://doi.org/10.1037/0033-295X.84.2.191>
- Bandura, A. (1994). Self-efficacy. In V. S. Ramachaudran (Ed.), *Encyclopedia of human behaviour* (Vol. 4, pp. 71-81). Academic Press.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. W.H. Freeman and Company.
- Bandura, A. (2000). Exercise of human agency through collective efficacy. *Current Directions in Psychological Science*, 9(3), 75-78. <https://doi.org/10.1111/1467-8721.00064>
- Bieschke, K. J. (2006). Research self-efficacy beliefs and research outcome expectations: Implications for developing scientifically minded psychologists. *Journal of Career Assessment*, 14(1), 77-91. <https://doi.org/10.1177/1069072705281366>
- Bolkan, S., Pedersen, W. C., Stormes, K. N., & Manke, B. (2021). Predicting 4-year graduation: Using social cognitive career theory to model the impact of prescriptive advising, unit load, and students' self-efficacy. *Journal of College Student Retention: Research, Theory & Practice*, 22(4), 655-675. <https://doi.org/10.1177/1521025118783485>
- Crawford, J., Purvis, A. J., Grieve, A., & Taylor, L. (2026). Authorship statement for generative artificial intelligence: Assuring trust and accountability. *Journal of University Teaching and Learning Practice*, 23(1). <https://doi.org/10.53761/v16abt43>
- Dautel, J. B. (2020). Applying a collective academic supervision model to the undergraduate dissertation. *Psychology Teaching Review*, 26(1), 18-26.
<https://files.eric.ed.gov/fulltext/EJ1257793.pdf>
- Day, J., & Bobeva, M. (2007). Applying performance management principles to a learning environment for undergraduate dissertations: A case study. *International Journal for Quality and Standards*, 1(1), 217-239.
<https://www.academia.edu/download/35481815/paper9.pdf>
- Del Río, M. L., Díaz-Vázquez, R., & Maside Sanfiz, J. M. (2017). Satisfaction with the supervision of undergraduate dissertations. *Active Learning in Higher Education*, 19(2), 159-172. <https://doi.org/10.1177/1469787417721365>
- Dong, S., Mao, J., Ke, Q., & Pei, L. (2024). Decoding the writing styles of disciplines: A large-scale quantitative analysis. *Information Processing & Management*, 61(4), 103718. <https://doi.org/10.1016/j.ipm.2024.103718>
- Dowd, J. E., Thompson Jr, R. J., & Reynolds, J. A. (2016). Quantitative genre analysis of undergraduate theses: Uncovering different ways of writing and thinking in science disciplines. *WAC Journal*, 27, 36-51. <https://doi.org/10.37514/WAC-J.2016.27.1.03>
- Engel, S. (2016). Honors thesis preparation: Evidence of the benefits of structured curricula. *Journal of the National Collegiate Honors Council*, 17(2), 115-124.
<https://digitalcommons.unl.edu/nchcjournal/534/>

- Erbay Çetinkaya, Ş., & Yılmaz, S. (2017). How BA students perceive graduation thesis writing process: A qualitative inquiry. *Journal of Narrative and Language Studies*, 5(8), 46-58. <https://nalans.com/index.php/nalans/article/view/66>
- Estermann, T., & Pruvot, E. B. (2014). Financially sustainable universities: Challenges and strategies in times of austerity. In P. Mattei (Ed.), *University adaptation in difficult economic times* (pp. 52-74).
- Estonian code of conduct for research integrity*. (2017). <https://www.digar.ee/arhiiv/nlib-digar:385822>
- European Commission/EACEA/Eurydice. (2024). *The European Higher Education Area in 2024: Bologna process implementation report*. Luxembourg: Publications Office of the European Union. <https://data.europa.eu/doi/10.2797/483185>
- Fagevik Olsén, M., & Bjerså, K. (2017). Undergraduate physical therapy students' experiences of supervision during bachelor thesis course. *Global Journal of Medical, Physical and Health Education*, 5(1), 183-190. <https://www.diva-portal.org/smash/record.jsf?pid=diva2:1068753>
- Gillespie, A., Glăveanu, V., & de Saint Laurent, C. (2024). *Pragmatism and methodology: Doing research that matters with mixed methods*. Cambridge University Press.
- Healey, M., Lannin, L., Stibbe, A., & Derounian, J. (2013). *Developing and enhancing undergraduate final-year projects and dissertations*. <https://www.advance-he.ac.uk/knowledge-hub/developing-and-enhancing-undergraduate-final-year-projects-and-dissertations>
- Herbas-Torrico, B. C., González-Bravo, P. R., Romero, D. G., Murillo-Ramírez, M. L., & Angulo-Rueda, J. (2024). Undergraduate dissertation problems: An aggregate cross-sectional analysis from five Latin American universities. *Studies in Higher Education*, 1-18. <https://doi.org/10.1080/03075079.2024.2359050>
- Hill, H. M. M., Zwahr, J., & Gonzalez III, A. (2022). Evaluating research self-efficacy in undergraduate students: Experience matters. *Journal of the Scholarship of Teaching and Learning*, 22(1). <https://doi.org/10.14434/josotl.v22i1.31203>
- Honicke, T., & Broadbent, J. (2016). The influence of academic self-efficacy on academic performance: A systematic review. *Educational Research Review*, 17, 63-84. <https://doi.org/10.1016/j.edurev.2015.11.002>
- Jaldemark, J., & Lindberg, J. O. (2013). Technology-mediated supervision of undergraduate students' dissertations. *Studies in Higher Education*, 38(9), 1382-1392. <https://doi.org/10.1080/03075079.2011.626851>
- Jones, E. A., Piontek, J., Walden, L. C., & Harrell-Williams, L. M. (2024). Development and validation of the sources of research self-efficacy scale. *Journal of Psychoeducational Assessment*, 42(1), 29-45. <https://doi.org/10.1177/07342829231204507>
- Jongbloed, B., & Vossensteyn, H. (2016). University funding and student funding: International comparisons. *Oxford Review of Economic Policy*, 32(4), 576-595. <https://doi.org/10.1093/oxrep/grw029>
- Kaakinen, P., Suhonen, M., Lutovac, S., & Kaasila, R. (2017). Students experiences of peer-support during a Master's thesis process. *Clinical Nursing Studies*, 5(1), 22-28. <https://doi.org/10.5430/cns.v5n1p22>

- Kangasniemi, M., Ahonen, S. M., Liikanen, E., & Utriainen, K. (2011). Health science students' conceptions of group supervision. *Nurse Education Today*, 31(2), 179-183.
<https://doi.org/10.1016/j.nedt.2010.05.015>
- Kiley, M., Boud, D., Manathunga, C., & Cantwell, R. (2011). Honouring the incomparable: Honours in Australian universities. *Higher Education*, 62(5), 619-633.
<https://doi.org/10.1007/s10734-011-9409-z>
- Kryshko, O., Fleischer, J., Waldeyer, J., Wirth, J., & Leutner, D. (2020). Do motivational regulation strategies contribute to university students' academic success? *Learning and Individual Differences*, 82, 101912. <https://doi.org/10.1016/j.lindif.2020.101912>
- Laidroo, L. (2024). *Supporting thesis finalisation self-efficacy of bachelor students - the case of one study programme*. Tallinn University.
<https://www.etera.ee/zoom/201867/view?search=laidroo>
- Larocca, R., & Carr, D. (2020). The effect of higher education performance funding on graduation rates. *Journal of Education Finance*, 45(4), 493-526.
<https://www.muse.jhu.edu/article/760719>
- Lent, R. W., & Brown, S. D. (2019). Social cognitive career theory at 25: Empirical status of the interest, choice, and performance models. *Journal of Vocational Behavior*, 115, 103316.
<https://doi.org/10.1016/j.jvb.2019.06.004>
- Lent, R. W., Brown, S. D., & Hackett, G. (1994). Toward a unifying social cognitive theory of career and academic interest, choice, and performance. *Journal of Vocational Behavior*, 45(1), 79-122. <https://doi.org/10.1006/jvbe.1994.1027>
- Liu, M. J., Cheng, Y. Y., & Chen, Y. T. (2022). Academic self-efficacy in a globalized era: Impacts of culture and cross-culture. In *Academic Self-efficacy in Education: Nature, Assessment, and Research* (pp. 111-130). https://doi.org/10.1007/978-981-16-8240-7_7
- MacDonald, S. (2010). *Professional academic writing in the humanities and social sciences*. Southern Illinois University Press.
- Manathunga, C., & Goozée, J. (2007). Challenging the dual assumption of the 'always/already' autonomous student and effective supervisor. *Teaching in Higher Education*, 12(3), 309-322. <https://doi.org/10.1080/13562510701278658>
- Martinez, C. T., Kock, N., & Cass, J. (2011). Pain and pleasure in short essay writing: Factors predicting university students' writing anxiety and writing self-efficacy. *Journal of Adolescent & Adult Literacy*, 54(5), 351-360. <https://doi.org/10.1598/JAAL.54.5.5>
- Martirosyan, N. M., Bustamantea, R. M., & Saxona, D. P. (2019). Academic and social support services for international students. *Journal of International Students*, 9(1), 172-191.
<https://doi.org/10.32674/jis.v9i1.275>
- Mayring, P. (2022). *Qualitative content analysis: A step-by-step guide*. SAGE Publications Ltd.
- McKenney, S., & Reeves, T. C. (2021). Educational design research: Portraying, conducting, and enhancing productive scholarship. *Medical Education*, 55(1), 82-92.
<https://doi.org/10.1111/medu.14280>
- Medaille, A., Beisler, M., Tokarz, R., & Bucy, R. (2022). The role of self-efficacy in the thesis-writing experiences of undergraduate honors students. *Teaching and Learning Inquiry*, 10. <https://doi.org/10.20343/teachlearningu.10.2>
- Mendoza, L., Lindblom-Ylänne, S., Lehtonen, T., & Hyytinen, H. (2023). Understanding master's thesis writers in a Finnish EMI context: Writing conceptions, apprehension about

- grammar, self-efficacy for thesis writing and thesis grade. *International Journal of Educational Development*, 103, 102874. <https://doi.org/10.1016/j.ijedudev.2023.102874>
- Miedijensky, S., & Lichtinger, E. (2016). Seminar for Master's thesis projects: Promoting students' self-regulation. *International Journal of Higher Education*, 5(4), 13-26. <https://doi.org/10.5430/ijhe.v5n4p13>
- Mitchell, K. M., Zumbrunn, S., Berry, D. N., & Demczuk, L. (2023). Writing self-efficacy in postsecondary students: A scoping review. *Educational Psychology Review*, 35(3), 82. <https://doi.org/10.1007/s10648-023-09798-2>
- Neupane Bastola, M., & Hu, G. (2021). "Chasing my supervisor all day long like a hungry child seeking her mother!": Students' perceptions of supervisory feedback. *Studies in Educational Evaluation*, 70, 101055. <https://doi.org/10.1016/j.stueduc.2021.101055>
- Ng, J. Q. X., Chua, J. S., Ang, W. H. D., Lau, L. S. T., Pereira, J. R., Ang, E. N. K., Chin, A. M. C., Toh, K. K., Wong, S. N., Shen, L., Chua, J. Y. X., Goh, Y. S. S., & Shorey, S. (2025). Redesigned final year research program for undergraduate nursing students: A mixed-methods study [Article]. *Nurse Education Today*, 147, Article 106620. <https://doi.org/10.1016/j.nedt.2025.106620>
- Niclasen, J., & Strøbæk, P. (2019). Group versus individual supervision of university students: A qualitative case study. *Journal of Teaching & Learning in Higher Education/Dansk Universitetspaedagogisk Tidsskrift*, 15(27), 118-135. <https://doi.org/10.7146/dut.v14i27.109618>
- Nordentoft, H. M., Thomsen, R., & Wichmann-Hansen, G. (2013). Collective academic supervision: A model for participation and learning in higher education. *Higher Education*, 65(5), 581-593. <https://doi.org/10.1007/s10734-012-9564-x>
- Olev, A., & Alumäe, T. (2022). Estonian speech recognition and transcription editing service. *Baltic Journal of Modern Computing*, 10(3), 409-421. <https://doi.org/10.22364/bjmc.2022.10.3.14>
- Pajares, F., Hartley, J., & Valiante, G. (2001). Response format in writing self-efficacy assessment: Greater discrimination increases prediction. *Measurement and Evaluation in Counseling and Development*, 33(4), 214-221. <https://doi.org/10.1080/07481756.2001.12069012>
- Parveva, T., Motiejunaite, A., Noorani, S., & Riiheläinen, J. (2022). *Structural indicators for monitoring education and training systems in Europe, 2022. Overview of Major Reforms since 2015. Eurydice Background Report*. <https://doi.org/10.2797/479169>
- Pasco-Dalla-Porta, M. M., Lau, M., Ponce-Regalado, F., & Pacheco Mariselli, M. M. (2024). Pedagogical strategies and academic performance in theses seminars: A study in an undergraduate management program in Peru. *Journal of Applied Research in Higher Education*, 16(1), 104-119. <https://doi.org/10.1108/JARHE-06-2022-0199>
- Piekart-Primiano, A., Regan, M., & Sacharow, L. (2017). Doing the honors: Designing a curriculum for a year-long thesis project. In M. K. Hensley & S. Davis-Kahl (Eds.), *Undergraduate research and the academic librarian* (pp. 69-81). Association of College and Research Libraries.
- Prat-Sala, M., & Redford, P. (2010). The interplay between motivation, self-efficacy, and approaches to studying. *British Journal of Educational Psychology*, 80(2), 283-305. <https://doi.org/10.1348/000709909X480563>

- Prat-Sala, M., & Redford, P. (2012). Writing essays: Does self-efficacy matter? The relationship between self-efficacy in reading and in writing and undergraduate students' performance in essay writing. *Educational Psychology*, 32(1), 9-20. <https://doi.org/10.1080/01443410.2011.621411>
- Purvis, A. J., & Crawford, J. (2024). Ethical standards in social science publications. *Journal of University Teaching and Learning Practice*, 21(09). <https://doi.org/10.53761/hqnqr710>
- Reeves, T. C., Herrington, J., & Oliver, R. (2005). Design research: A socially responsible approach to instructional technology research in higher education. *Journal of Computing in Higher Education*, 16(2), 96-115. <https://doi.org/10.1007/BF02961476>
- Richardson, M., Abraham, C., & Bond, R. (2012). Psychological correlates of university students' academic performance: A systematic review and meta-analysis. *Psychological Bulletin*, 138(2), 353-387. <https://doi.org/10.1037/a0026838>
- Robson, J. V. K. (2022). An action research inquiry: Facilitating early childhood studies undergraduate researcher development through group supervision. *Educational Action Research*, 30(5), 689-706. <https://doi.org/10.1080/09650792.2021.1872395>
- Schermer, T., & Gray, S. (2012). *The senior capstone: Transformative experiences in the liberal arts*. https://www.teaglefoundation.org/Teagle/media/GlobalMediaLibrary/documents/resources/The_Senior_Capstone.pdf?ext=.pdf
- Scholefield, D., & Cox, G. (2016). Evaluation of a model of dissertation supervision for 3rd year B.Sc. undergraduate nursing students. *Nurse Education in Practice*, 17, 78-85. <https://doi.org/10.1016/j.nepr.2015.11.006>
- Shaw, K., Holbrook, A., & Bourke, S. (2013). Student experience of final-year undergraduate research projects: An exploration of 'research preparedness'. *Studies in Higher Education*, 38(5), 711-727. <https://doi.org/10.1080/03075079.2011.592937>
- Stappenbelt, B., & Basu, A. (2019). Student-supervisor-university expectation alignment in the undergraduate engineering thesis. *Journal of Technology and Science Education*, 9(2), 199-216. <https://doi.org/10.3926/jotse.482>
- Steele, A. R., & Douglas, H. E. (2021). Investigating the educational experiences of transnational students: Differences in academic integration, social integration, and institutional and goal commitment. *British Journal of Educational Psychology*, 91(4), 1414-1433. <https://doi.org/10.1111/bjep.12424>
- Strebel, F., Gürtler, S., Hulliger, B., & Lindeque, J. (2021). Laissez-faire or guidance? Effective supervision of bachelor theses. *Studies in Higher Education*, 46(4), 866-884. <https://doi.org/10.1080/03075079.2019.1659762>
- Succi, C., & Canovi, M. (2020). Soft skills to enhance graduate employability: Comparing students and employers' perceptions. *Studies in Higher Education*, 45(9), 1834-1847. <https://doi.org/10.1080/03075079.2019.1585420>
- Todd, M., Bannister, P., & Clegg, S. (2004). Independent inquiry and the undergraduate dissertation: Perceptions and experiences of final-year social science students. *Assessment & Evaluation in Higher Education*, 29(3), 335-355. <https://doi.org/10.1080/0260293042000188285>
- Todd, M. J., Smith, K., & Bannister, P. (2006). Supervising a social science undergraduate dissertation: Staff experiences and perceptions. *Teaching in Higher Education*, 11(2), 161-173. <https://doi.org/10.1080/13562510500527693>

- Van Dinther, M., Dochy, F., & Segers, M. (2011). Factors affecting students' self-efficacy in higher education. *Educational Research Review*, 6(2), 95-108. <https://doi.org/10.1016/j.edurev.2010.10.003>
- Wang, F., & Hannafin, M. J. (2005). Design-based research and technology-enhanced learning environments. *Educational Technology Research and Development*, 53(4), 5-23. <https://doi.org/10.1007/BF02504682>
- Wichmann-Hansen, G., Thomsen, R., & Nordentoft, H. M. (2015). Challenges in collective academic supervision: Supervisors' experiences from a Master programme in guidance and counselling. *Higher Education*, 70(1), 19-33. <https://doi.org/10.1007/s10734-014-9821-2>
- Winsor, D. A. (1990). Engineering writing/writing engineering. *College Composition and Communication*, 41(1), 58-70. <https://doi.org/10.2307/357883>
- Wisker, G. (2018). Frameworks and freedoms: Supervising research learning and the undergraduate dissertation. *Journal of University Teaching and Learning Practice*, 15(4), 2. <https://doi.org/10.53761/1.15.4.2>
- Wolf, L. W. (2018). Undergraduate research as engaged student learning. *New Directions for Teaching and Learning*, (154), 75-85. <https://doi.org/10.1002/tl.20293>
- Zimmerman, B. J., & Kitsantas, A. (2007). A writer's discipline: The development of self-regulatory skill. In G. Rijlaarsdam, S. Hidi, & P. Boscolo (Eds.), *Studies in Writing* (Vol. 19, Writing and motivation, pp. 51-69). Elsevier. https://doi.org/10.1163/9781849508216_005