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Student Teachers as Co-creators when Elaborating on a Model for Multimodal Text Analysis

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This paper aimed to examine and describe how a model for analysing multimodal texts is tested and elaborated on with students as co-creators during a teacher education course focusing on scientific awareness. The research questions used to achieve the aim were: How did the students as co-creators contribute to the development of the analytical model? What changes were made during the process, and how was the model adjusted accordingly? How can the process and the adjustments in the model be further interpreted in relation to the concept of student agency? Using a multimodal social semiotic framework for communication, we investigated three different groups of students using focus group discussions, video recordings, and participatory observations. The results revealed the development of the model through a design process in three design cycles into the current version and how students contributed to this process. The findings showed that students are offered agency while creating an opportunity for joint exploration between students and teachers, which is a rewarding experience that contributes to the development of all participants.

Keywords: higher education, multimodal text analysis, student agency, students as co-creators

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1. Introduction

It has been stressed that it is important to involve university students in research so that they learn about the research process and how to apply theory in reports and essay writing (Casanova et al., 2018; Trowler, 2010). This paper describes one such initiative in which student teachers are involved in developing and refining a theoretical model used in the analysis of multimodal texts. This approach was adopted due to our observation that many students in teacher training have difficulties understanding and applying theories and adequately using them when analysing, for instance, multimodal texts. The model we used to introduce multimodal text analysis was shown to have both pros and cons. One disadvantage was that students found the model difficult to understand and apply. This aligns with previous research findings that multimodal terminology can be perceived as abstract and difficult to understand and apply for people who are not researchers in the area (Cloonan, 2011). According to Lindgren and McDaniel (2012) and Leadbeater (2017), students are more likely to be motivated and strengthened in their understanding of challenging learning content when allowed to play an active role in the construction of knowledge. Therefore, we decided to include students in the development of a user-friendly model that would be suitable for students in higher education. This gave us greater insight into the students' perspectives so that we could learn more about what aspects should be included in a model to make it easier for them to apply. The model's focus on multimodal texts originated from our observation that students were increasingly interested in analysing texts from a multimodal perspective in teacher training. This increased interest may be due to digitalisation, in that most of the texts that people encounter and create today are digital and contain several modes, such as writing, imagery, and sound, i.e., multimodal texts (Kress, 2010). When the patterns of communication are digital and multimodal, there is a greater need to be able to analyse and understand these complex texts.

When students' everyday activities increasingly consist of multimodal content, such as social media, websites, music, and fiction, a need to expand their understanding of digital multimodal texts arises (Kress, 2010). One way to increase knowledge concerning how to access and analyse multimodal text is to take an active role in the process of developing one's own learning (Trowler, 2010). In this study, knowledge development concerns a tool for accessing and analysing multimodal text. Education continues to face challenges in meeting and assessing the contemporary text-making culture, meaning that there is still much to learn before education adopts multimodal ways of making and assessing texts (Edwards-Groves, 2011; Shanahan, 2012; Silseth & Gilje, 2019).

Further, research on students' multimodal meaning-making in informal environments has highlighted the importance of bridging informal text activities with formal text activities (Bezemer & Kress, 2017; Jewitt, 2012). The importance of analysing texts from a multimodal perspective has also been demonstrated in empirical studies (Dahlström & Damber, 2020; Norberg, 2019). In other words, there is still a crucial need to expand the knowledge and understanding of digital multimodal texts (Bezemer & Kress, 2017; Kress, 2010) and to develop suitable, understandable, and applicable models to analyse multimodal texts. This study aims to meet that need.

In this paper, we will give an example of student-active learning in which the students are co-creators in the development of a model to be used when analysing multimodal text. With this experience, students can gain a deeper understanding of how theory can be put to practical use and how to use an analytical model as a tool to increase theoretical awareness. In this case, multimodal social semiotic theory was used as an example of applying theory in essay writing.

The aim of this paper is to contribute knowledge about how a model for analysing multimodal texts is created and elaborated on with students as co-creators during a teacher education course focusing on the use of theory and methodology in essay writing.

The following research questions are addressed:

- In what way do students, as co-creators, contribute to the development of the analytical model?
- What changes were made to the model during the process?
- How can the process and the adjustments in the model be further interpreted in relation to the concept of student agency?

2. Background

The background is divided into two sections. The first section presents research on models for multimodal text analysis, and the second section discusses research on students as co-researchers and active agents in higher education.

2.1 Research on models for multimodal text analysis

Several frameworks for working with texts with a focus on writing have been developed (Rose & Martin, 2012). However, as a consequence of the increased multimodal nature of texts and communication, there is a need to develop tools that can help analyse and understand multimodal texts (Kress, 2010; Tang et al., 2014). Researchers who have taken on this task include Danielsson and Selander (2016) and Tang et al. (2014). Danielsson and Selander (2016) developed a model for working with multimodal texts in education with the intention of highlighting multimodal text analysis in relation to the subject content. The model of Danielsson and Selander (2016) is empirically grounded in classroom studies and involves aspects of general textual structure, interaction between textual parts, figurative language, and values. Cloonan (2011), on the other hand, claims that the terminology of multimodal theory is rather complicated and is perceived by teachers and students as abstract and difficult to apply. She performed a study in which teachers were included as co-researchers. One result was that teachers described the language as overly theoretical and abstract, which positioned them as outsiders in relation to the discourse used in the framework. In collaboration with researchers, teachers in the project explored, critiqued, applied, and adjusted the original theoretical work to provide relevance to the textual work they do in the classroom. Cloonan (2011) found that there is a need to develop a meta-language about multimodality for students, teachers, and researchers to enable discussion of the meaning-making dimensions of multimodal texts. Without a language to organise thinking about multimodal text, understanding will be limited (Cloonan, 2011; Kalantzis & Cope, 2012). In comparison with the models described above, the model developed in this study, which includes students, has a stronger focus on higher education and the need for students to understand how theory can be used in scientific analyses.

2.2 Students as co-researchers and active agents in higher education

The most important actors in education are students and teachers; therefore, a relevant research design must include both groups (Casanova et al., 2017; Trowler, 2010). Several studies have investigated the impact of using both students and teachers as part of the research design (Bovill et al., 2015; Cameron & Tanti, 2011; Leijon, 2016). According to Bovill et al. (2015), four different roles can be identified concerning students' co-creation in research and development within higher education programmes: a) consultant, b) co-researcher, c) pedagogical co-designer, and d)

representative. According to Trowler (2010), there are many who benefit from involving students as co-researchers in higher education. The students themselves benefit by being involved in their own learning, the researchers benefit when developing their line of inquiry, the teachers benefit when developing learning environments, and universities benefit from high student engagement. Further, Trowler (2010) and Barnett (2007) argue that involving students as co-researchers can be described as offering students active involvement in their learning, emphasising individual agency. How students have been used as co-creators in different roles is described below.

Using a relational view of agency, Timmis and Williams (2013) studied students' engagement in researching the use of digital media in their learning. The researchers argue for the benefits of shared reflection and action between students, teachers, and researchers. This process led to the development of a model of inquiry, where students and staff collaborated in research and knowledge production. This type of methodology involves students as co-researchers in their own educational practices (Timmis & Williams, 2013). The researchers' findings indicate that there are no quick fixes to implement the inclusion of students as co-researchers. For models to be successful, it is necessary to have long-term collaborations and to get students more involved in the entire process, including setting objectives within the research they are involved in (Garcia et al., 2018; Timmis & Williams, 2013). A study by Garcia et al. (2018) aimed to analyse students' roles in and contributions to the co-design process. Results from the study indicate that students want to be a part of research and contribute to learning scenarios in higher education. However, students tended to highlight shortcomings rather than offer alternatives or solutions to them. Students were engaged in the co-design process, but the researchers indicated that the late incorporation of the students into the process limited their contribution to and impact upon the learning scenarios.

The use of participatory design as a method for designing learning spaces in research offers opportunities for students in higher education to engage as participants, experts, and partners whose voices are considered significant when creating learning spaces. In studies by Casanova et al. (2018) and Leijon (2016), the most valuable finding was that students were co-creators in an agentic way when creating purposeful spaces for pedagogic practices. Using design principles in research can contribute to improvements in both learning practices as well as in teachers' understanding of how students learn to learn. This, in turn, can mean that teachers will be able to

design learning practices that empower students' agentic capacity in learning to learn (Engeness, 2021).

Studies on design-based research indicate that the approach must consider two goals: to develop an intervention for a practice-based problem and to conduct empirical studies to develop a theoretical understanding that can inform both research field and practice (McKenney & Reeves, 2013). An in-depth analysis of design studies indicates that as the field continues to grow, the focus on educational research is increasing. One study that addresses both the practical problem (how teenagers can deal with social network sites) and the actual process of using a design approach is the study by Vanderhoven et al. (2015). In an evaluation of the design-based approach, the researchers found that the collaboration between researchers and practitioners made it possible to address the needs of the practice as well as the needs of the research. However, they emphasise the same problem that Anderson and Shattuck (2012) and McKenney and Reeves (2013) had previously emphasised: the challenge of knowing when to stop trying to improve the design and decide that the research is complete.

3. Conceptual Framework: Student Agency and Multimodal Social Semiotic Theory of Meaning and Communication

In this study, the concept of agency refers to students' active participation and their opportunities to act independently in text-making activities in an educational context (Bezemer & Kress, 2016; Selander & Kress, 2010). When analysing texts, power and agency are essential, as all texts carry meaning, and when meaning-makers, for instance, students, are allowed to be active agents, the concept of agency can be used (Kress, 2010). Agency can be understood as something that is achieved in and through engagement with a particular temporal relational situation, for example, engagement in a lesson concerning theory. The idea of achieving agency moves the explanation away from an individual possession. Thus, agency is not something a person has (Biesta & Tedder, 2006; Selander & Kress, 2010) but is instead about acting rather than being acted upon (Leadbeater, 2017). When students are allowed to play an active role in their meaning-making, they tend to show greater motivation to learn and are more likely to define objectives for their learning (Schoon, 2017). Further, Schoon states that the development of agency can be seen as a relational process involving interactions with students and teachers over time. A learning environment built on co-

agency, where students and teachers work together on learning content, can, according to Leadbeater (2017), mean that students are more motivated to learn, thus increasing their understanding of the subject content. Developing student agency can then be seen as part of a learning process that can be studied empirically and can be described in terms of achieving more or less agency, rather than achieving or not achieving agency (Priestley et al., 2015).

The model developed and elaborated on in this study considers multimodality and questions concerning agency and power. Using a multimodal perspective on a model makes it possible to analyse and include aspects relating to the content, form, and function of texts (Insulander et al., 2017). According to Kress (2010), questions that are essential to ask regarding texts are questions that concern those whose interests and agency are foregrounded.

Multimodality means that all different modes involved in communication and representation are considered to carry meaning (Kress, 2010). Social media sites, computer games, textbooks, student texts, children's books, TV shows, and road signs are examples of multimodal texts (Kress, 2010). Each mode thus has a specific potential to create meaning for a larger whole. According to Kress (2010), this can be seen as an argument for taking multimodality as the normal state of human communication. Using a multimodal perspective makes it possible to analyse what modes are used in, for example, text-making as a process and texts as representation. However, multimodality cannot tell us anything concerning what the use of different modes means. Answering questions about meaning or content makes it necessary to combine multimodality with theory that can deal with meaning. In the case of the model developed, we used the concepts of agency and social semiotics for meaning (Kress, 2010).

Further, the analytical model elaborated on in this article is based on the assumption that content and form together create meaning and are dependent on each other (Kress, 2010). In the development of the model, we have also been inspired by the conceptual framework developed by Halliday (1978) in which texts contain three different meta-functions, wherein the overall meaning of the text appears in interaction with the different functions. According to Halliday, the *ideational function* touches on the content and meaning of texts concerning actions, states, and events in the world. At the same time, there is an *interpersonal function* in the text that represents meaning about social relations between those engaged in communication. Finally, the *textual function* focuses on the form of texts, how the parts are organised to be perceived as a meaningful whole, and how the

entities or resources interact (Halliday, 1978). Texts thus contain both ideational, interpersonal, and textual meaning. The overall meaning of a text emerges from the interplay between functions.

4. Methods

The study is based on a design process in four steps. The process started with an analysis of a practical problem that needed a solution. As described in the introduction, there is a need to develop an analytical model that students can use in the analysis of multimodal texts. The second step involved the development of solutions based on existing knowledge. This led to the first version of the analytical model, which was based on previous research and previously existing models in the field of multimodal social semiotics. The third step meant evaluating the identified solutions in practice and involved iterative cycles, wherein students were included as co-creators in testing and developing the model. This was done in three design cycles with three different student groups. A design cycle begins with presenting a model to a group of students, which is tested and then adjusted. The fourth step implied reflections concerning findings from the former steps and further development of the model. This last step also included theoretical reflection regarding the model. This is summarised in the figure below (see Figure 1).

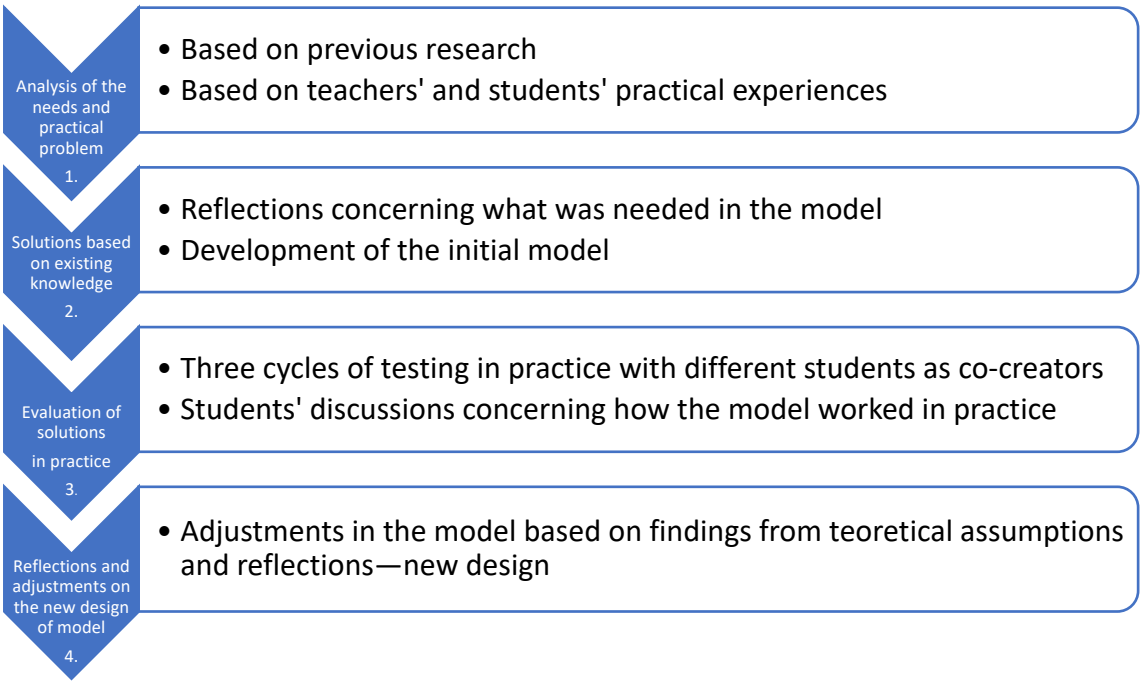

Figure 1: The design process.

4.1 Procedure and sample

The data consists of focus group discussions (Bryman et al., 2022), participatory observations, and video materials of students as they worked with different versions of the model. We worked together with different student groups to elaborate on an analytical model, which was further developed and adjusted over a period of approximately one year. This meant that we functioned as both researchers and teachers during these sessions. The students were chosen from a convenience sample (Grey, 2013). One group (Group A) consisted of eight students from a university course in multimodal theory and analysis. These students had varied educational and professional backgrounds, including various teaching specialisations and other professions in the humanities or behavioural sciences. Focus group discussions and participatory observations were used for documentation and video recording. The other two student groups (Groups B and C) consisted of approximately 30 and 40 students, respectively, who were in their final semester of studies within the preschool teacher education programme. These groups were documented in focus group discussions and participatory observations. There are thus differences between Group A and the other two groups in that the students in Group A have a more varied background than the other two groups. However, we argue that all three groups are relevant, as they are all students in education studying analytical models for analysing multimodal text. All students gave their consent to participate in the study.

The students were first involved in discussions about the theoretical framing of the analytical tool and then used the tool to perform a multimodal analysis. After this step, the students discussed the pros and cons of using the tool with both their peers and with the authors, serving here in the roles of both researchers and teachers. Thus, the version described in this text as the current model (Table 3) has undergone several stages of development. However, we avoid describing it as a final model, as it is reasonable to expect that the model can be elaborated further in other contexts. On the other hand, we believe that the model can be useful for both students and researchers in its current iteration. It should also be noted that the design of the work process described below was not determined in detail in advance but was developed during the process.

The participation of the three groups differed slightly. One of the course tasks for Group A was to analyse one of their own texts using the analytical model, which they then presented orally. In a virtual meeting, the presentations (between 20 and 30 minutes) were documented, and everyone

chose different objects for their analysis, ranging from teaching materials and student texts to recipe books and graffiti. The presentations were followed by a focus group discussion in which the students were encouraged to describe the model's merits and shortcomings. The recorded reports were analysed based on the following questions:

1. What is the report about? (Content)
2. What forms of expression are used, and how are they used? (Form)
3. How is the analytical model communicated in the text? (Function)
4. How do students describe the use of the model? (Content, meta-level)

We also took notes during the presentations.

Groups B and C participated in a workshop where the students tested the analytical model by working in groups of three to four people and then orally presenting their results to the whole class. The students chose to analyse either a textbook or a children's book. The workshop lasted 180 minutes, and the students worked in groups for 60 minutes. We took notes during the students' presentations of their analyses at the end of the workshop. After these presentations, a focus group discussion followed, in which the students were encouraged to describe the model's merits and shortcomings. The model was also presented twice to a research group at our department, from which we received constructive comments and questions. After the seminar, we reflected on how the comments and questions that emerged could develop our understanding and help us further develop the model.

4.2 Framework for analysis

The concepts of design, design *for* learning, and design *in* learning were used when analysing the process described above, which will be presented in the following. The concept of design involves both students and researchers actively gaining experience and knowledge while also participating in the development of that knowledge. Design and meaning-making are understood as dynamic processes in which the individual is actively involved and a co-creator (Kress, 2010; Selander & Kress, 2010). According to Selander and Kress (2010), the design process can include two aspects: design *for* learning and design *in* learning. Design *for* learning can be described as the available conditions, such as institutional settings and educational norms, as well as social and cultural

backgrounds. Students enter university with varying backgrounds and different experiences and interests, which may be reflected in their meaning-making. Design *in* learning can be described as learning as agency (Kress, 2010), where the individual's redesign of their learning process is in focus. Thus, the students are seen as co-creators in designing knowledge through cycles of design processes. When students use design *for* learning to transform the information in the redesign of a model, design is seen as a cyclical process in which the redesigned result is a new design *for* learning. In relation to the development of an analytical model, design *for* learning can help us understand how our first model, as part of the educational setting, is built upon previous research and the researchers' understanding of what resources are needed when analysing multimodal text. Further, design *in* learning can be used to understand how the students perceive their ability to use the resources available in the model and how they, as co-creators, transform the model to create a new design that other students can use in their analyses. The redesigned model can then be seen as a unique product of students' agency that becomes a newly accessible design and a new source of meaning that is accessible to others, as students make choices from available resources, which then transform their understanding into new representations (Selander & Kress, 2010). The design process, composed of three different design cycles, is presented in the results section. The cycle starts with a model that is tested by one of the student groups and then developed further. After this step, a new design cycle begins.

The analysis was deductive, inspired by the model of a thematic analysis according to Braun and Clarke (2006), and carried out in parallel with the various design cycles. The concepts of design *for* learning and design *in* learning (Selander & Kress, 2010) guided us; thus, the analysis can be called a theoretical thematic analysis (Braun & Clarke, 2006). Each concept was used to code and categorise the data. When analysing the documentation of the focus group discussions and participatory observations, the entire analysis process was a joint effort between both authors following the steps of a thematic analysis (Braun & Clarke, 2006, 2022). Initially, in accordance with the analysis method, we familiarised ourselves with the data by reading through the observation protocols and looking through the video material. In our analysis of the video material, we started by individually viewing the material, taking notes, and sorting the students' expressions about the use of the model into preliminary codes. This was done directly after each observation to generate observations that were as rich as possible. The next step was to code all the material together in order to capture specific and particular meanings in the dataset that were relevant to

our concepts and research questions. In this phase, words and sentences related to our concepts and research questions were coded and categorised. The third step involved using the codes to create conceptual patterns and shared meanings among students concerning the model; thus, preliminary themes concerning how to develop the model were created. We then tested the themes against our theoretical starting points and research questions and determined the final themes, which are described in the results section. In the next step, we discussed what we had found and made a compilation of the material, which we used to develop the model into its next iteration. After this, the concept of agency was used for further interpretation and analysis in order to reach a more profound understanding of the process and the adjustments in the model. With the help of this concept, the results were coded and analysed, with further inspiration from the analysis process of Braun and Clarke (2006).

4.3 Ethical considerations

The research followed the Swedish Research Council's ethical codex (Vetenskapsrådet, 2017), and the empirical data has been processed accordingly. The students were informed in advance about the aim of the study. They were also informed that participation was voluntary, that they could cancel their participation if they so wished, that personal data would be handled confidentially, and that collected data would only be used for research purposes in this study (Vetenskapsrådet, 2017). All material was processed and stored following the Data Security Plan of Mid Sweden University and in accordance with the EU's General Data Protection Regulation (GDPR, Regulation (EU) 2016/679, 2016). An ethical dilemma that should be raised is that the different student groups had different opportunities to meet the analytical model. Group C encountered a much more elaborate model that differed relatively much from the model that Group A encountered. This can be seen as unfortunate and unfair, but at the same time, it was inevitable in that this was the very process that led to the development of the analytical model. In addition, the process was carried out over several semesters, which did not allow us to get back to the previous student groups. Since we were both researchers and teachers in this process, we may have affected the results by asking questions based on our understanding of the needs of the student group, the goals of the course, and the students' willingness to participate in the study. There is always a risk that students may feel pressured to participate when researchers are also teachers of the participants in question. However, this activity was not part of the examination of the course, and we thus hope that the

students could feel free to express their opinions and that their participation in the study was voluntary and not to please us as teachers.

5. Results

In this section, the results of the design process, understood as design *for* learning and design *in* learning, in different versions are presented. These findings are further interpreted and discussed in relation to the concept of student agency and will be presented in the discussion section.

5.1 The first version of the model is tested

The first design cycle started with a design *for* learning (Table 1). The model contained three different parts, with each part being concretised with the help of different questions to support the analysis work.

Table 1: Version 1 of the model.

Content	**What is the text about?** • What experiences and perceptions are expressed in the text? • What is expressed in the different modes? (e.g., image, writing, symbols)
Form	**How is the text presented?** • What modes are used? • How well do the different modes interact? Complementary, contradictory
Function	**How functional is the text?** • How well is the purpose of the text/task communicated? • Which mode or modes have the most significant functional weight?

This version was tested by Group A and is understood as design *in* learning. Overall, the students expressed that they saw the multimodal analytical model as useful in the analysis of various texts and activities, as the following quote exemplifies:

> I thought the questions helped. It forces one to think, which aids in analysis. How well the parts interact—those questions helped to get a little more in-depth. Other multimodal analyses that I have Googled are a bit difficult. I got help in analysing how the different parts interact.

Another student stated that "the school world is limited; we need tools to understand the multimodal aspects of it".

Students expressed in different ways that they could really use analytical tools developed for their needs and tools that they knew how to use since they found existing models difficult when analysing text.

However, we found that the students understood and used the model to varying degrees. The themes that emerged concerning clarification were: *the model as a whole, understanding individual parts of the model,* and *specific terms in the model.* Some students did not understand the model but focused on other content, while others used it purposefully. Students expressed that *form* and *content* overlapped and could easily be conflated in the analysis work, as one student exemplified:

> It is really hard to not describe the form at the same time as you analyse the content in different modes. Why should it be separated? I think it would be more useful if we could do this at the same time as they overlap.

Some of the students found the *functional* part difficult to access and understand. The *content* part caused difficulties because the students analysed the content of the texts differently. The students expressed that the model offered support, and we noted that they did in fact perform a multimodal analysis. However, not everyone understood the meaning of the term *mode* in the model. We realised that the *content* and functional parts of the model needed to be developed and that the model's list form may have contributed to the interpretation that the analysis should be done by analysing each part separately, from top to bottom. This led us to clarify that the analyses of *form* and *content* may need to go back and forth before moving on to the next step of analysing the function of the text. Furthermore, the functional part could be explained more clearly.

5.2 The model is further developed

Next, a new design *for* learning was created, and the second design cycle started. Due to students' perspectives on understanding and using the model, we made adjustments (Table 2). Using the students' comments, we decided to place the headings for *form* and *content* next to each other, signalling that they are closely linked and should not be separated. We also attempted to clarify the *content* and *function* parts by reformulating them and adding questions. In the focus group discussion, students came up with the suggestion that providing questions would help keep the focus on the analyses. Version two of the model was thus visually developed, where *form* and *content* are analysed first and then *function*. The students were instructed to read the model from top to bottom.

Table 2: Version 2 of the model.

Form	**Content**
How is the text presented? • What modes are used? • How well do the different modes interact? Complementary? Contradictory?	What is the text about? • What experiences and perceptions are expressed in the text? • What is expressed in the different modes? (e.g., image, writing, symbols)
Function How functional is the text? Or: How well does the text work based on its purpose? • How well is the purpose of the text communicated? • Which mode or modes have the most significant functional weight?	

As shown in Table 2, the model's visual expression was adjusted, and each part was given a subheading to clarify the focus of each part of the analytical model. We chose to place the *Form* column on the left and the *Content* column on the right since the students expressed that they first noticed the text's form.

A new design *in* learning was performed in which Group B was asked to apply the model. The students generally expressed that they supported the model, which generally worked, but that some parts were difficult to grasp. The themes that emerged concerning clarification were: *the focus of the analysis*; *applying theoretical perspectives to the model;* and, once again, *understanding individual parts of the model.* The students had some difficulties keeping the focus on what to analyse, so we made the adjustment to incorporate a written instruction in the model indicating the need for a research question. One student formulated this as:

> It would be easier if we start with formulating a question for the data. That will help to keep focus on what to analyse; it could be like: How can this text be analysed from a gender perspective, from a norm-critical perspective, or even from a subtraction perspective?

According to the students' discussion about the question that needs to be stated to carry out the analysis, we interpreted that this needs to be integrated into the analytical model. The students also described that they lacked the opportunity to include the complementary theoretical perspective directly in the analytical model. The students reported that the functional part was difficult to grasp, especially the wording, *the most significant functional weight*.

Our analysis of the students' work and their discussions about its merits and shortcomings led to further adjustments to the model. A question field was added at the top of the model to clarify that the analysis work starts with the formulation of a question. In the second version of the model (Table 2), this was only stated in the instructions to the model. In all other respects, we retained the instructions regarding how questions can be formulated as described in version two of the model. In the *content* section, we added a question about the purpose of the text. The wording *functional weight* was changed to "Which mode or modes work best based on the purpose of the text?". We also clarified the *content's* subheading: "What message is expressed?" and reformulated the questions in the *function* section. This was the design *for* learning given to the third student group. As the adjustments were minor in this third cycle, this version of the model is not shown.

The design *in* learning for Group C was then completed. In the subsequent discussion, in which the students described the model's merits and shortcomings, they reported that the model was mainly easy to use. The themes that emerged concerning clarification were: *understanding individual parts of the model* and *using different aspects of the model in parallel.* Some students expressed uncertainty

about the purpose mentioned in the *function* section, which means that the students in this cycle also expressed wishes for the development of this aspect of the model. This was exemplified by one student: "For me, it is not clear what the purpose of the text is. Am I supposed to think about my purpose for the analysis, or can it mean what purpose the author of the text had when creating it?".

These reflections were interpreted as students being unsure whether it was the author's purpose or their own purpose that should be central in the analysis, an ambiguity that we noted and set out to clarify. Another proposal from the students was the addition of a question about from whose perspective the text is written. We considered that this is even more relevant for fictional texts than textbooks and that this was something that needed to be clarified in the model. If, for instance, a mathematical textbook is analysed from a subject matter content perspective, questions of whose purpose is of interest are not central, but rather what mathematical content the exercise is intended to teach. On the other hand, if the analysis focuses on gender perspectives in children's books, the question of whose purpose is of interest in the text.

We also interpreted the students' statements about perspectives as expressions of critical questions about the message of texts, which was noted for further development. There were examples of students who expressed that they did not use the parts of *form* and *content* in parallel but rather one by one, which means that we need to further clarify that these two parts are closely interwoven. During the design process, we saw that the students described and understood the use of theory in essay writing in a deeper and more nuanced way. How to use theory and what theory was suitable for the students' aim in the essays were more in focus in the discussions, and the students compared how different groups used the model.

5.3 The model takes its current form

In the last step of the design process, which involved a more developed version of the model, we also returned to the model's theoretical foundation, multimodal social semiotics. This is also the last design *for* learning in the study.

We found that we did not initially consider the full meaning of how the text's interpersonal function could be understood. The function, or *aspect,* which was the concept chosen for our model, represents meaning in the social relations between those who are engaged in the communication

that is in focus, or how the text creator communicates with the reader (Halliday, 1978; Kress, 2010). In the previous iterations of the model, we focused on how the text communicates with the reader, i.e., how the text manages to communicate based on its purpose. The part that deals with the representation of meaning in social relations between those involved in communication was not visible. This could be the reason the students had difficulty understanding this part. Some students also asked for a question that could guide them in their analysis of critical questions that concerned whose interest is represented in the text. As one student formulated it:

> I would appreciate it if there was more focus on critical reflections on texts, as we have talked about how important that is. If there were a direct focus, like a question, within the analytical model, this would not be forgotten.

This reflection, based on the needs of the students, was very important and considered a central aspect of the theory chosen for the analytical model. When we returned to the theoretical foundation, we realised that the theory's critical dimension was not visible. Kress (2010) explains that it is essential to ask these critical questions when analysing texts. These insights led us to develop the model by adding questions to support the analysis. However, adding too many questions to the model could also be constraining, as the students may try to answer them all. We chose to clarify that the text analysis is intended to consider several different aspects in accordance with the theory and that the questions inside the model are only examples of questions that could be modified depending on the aim of the analysis.

In the fourth and current version of the model (Table 3), several changes can be seen. In addition to changing the headings, as described above, we decided to show that *form* and *content* belong together and cannot be separated by removing the vertical line that was present in the previous models. To reinforce the interaction, arrows were added. The instructions for the model are to read it from top to bottom and start by formulating a question, with the description: "Formulate a question for the data material. It can be of a different nature. Examples of questions: How can this text be understood from a gender perspective? (theoretical perspective) or How can this text be understood from a subtraction content? (subject matter content)".

Table 3: Version 4 of the model.

Question	
Textual aspect - How the text is presented Modes used in the text Interaction between the modes	**Content aspect** - What the text is about The overall content of the text Content expressed in different modes
Relational aspect - How the social relations are portrayed in the text The purpose of the text People represented in the text Interest and agency represented in the text	

The person who is creating text, for example, a student, needs to create *content* based on the purpose of the text assignment and interest, the *content aspect*. The student also needs to determine the *form*, the *textual aspect*, how the content should be designed, and which resources are best used to convey the text's message. Resources in this context can be digital or analogue resources or various modes, such as images, writing, or symbols. The creation of text can therefore be described as a link between *content* and *form*. How something is shaped becomes important for the perception and understanding of the text's message. This leads us to the third part of our analytical model, the *relational aspect*, which concerns social relations in the text. The relationships can concern those who are the focus of the communication in the text or the communication between the text creator and recipient.

6. Discussion

This study identifies several challenges with the different versions of the model developed by the authors, and the students' input significantly informed the design process. In this final section, we

will discuss how the design process can be understood through the concept of student agency and how it contributes to students' understanding of the use of theory in essay writing.

6.1 Understanding the design process based on the concept of student agency

In this section, we will discuss the students' participation during the process and their contribution to the development of an analytical model, thus determining if student agency was achieved. By using the concepts of design *for* learning and design *in* learning, the students' work with the model can be understood as design cycles. The students were introduced to a learning situation (design *for* learning). When testing the model, they achieved agency by participating in and influencing the learning situation (design *in* learning). The design *in* learning situation was in turn the basis for a new design *for* learning situation, and this continued in three cycles. In each cycle, new knowledge was acquired, which formed the basis for the next cycle. Design *in* learning can, in this context, be understood as learning by student agency (Kress, 2010).

The students' active participation, or student agency, during the process meant that the model was developed in several ways, where students achieved more agency in some situations and less in others: visually, according to content, and in combination with theoretical perspectives. The changes that were made in the design *in* learning situations were built on student agency, and the product of the transformed model can be seen as a product of student agency that becomes a new available design (Selander & Kress, 2010). The changes made are described in the results section and summarised here. Firstly, the visual design was developed in several ways, including changes to the reading instructions. Secondly, a question field was added to support the analysis, the wording was reformulated, and certain words were changed. The students' questions caused us to re-examine the basic assumptions of the multimodal social semiotic perspective and clarify agency and power, as we had previously focused mainly on the multimodal aspects (that communication is made with different modes). The model thus gained greater theoretical weight as it developed. Thirdly, the design process offered opportunities to test the model from different theoretical perspectives, which yielded valuable knowledge.

One example of when students in Group B achieved extensive agency in the process was when they expressed difficulties keeping their focus on what to analyse in their material. From the students, we got the suggestion to incorporate a written instruction in the model indicating the

need for a research question. In other words, we adjusted the model based on the students' expressed needs. Another example of extensive agency occurred when the students in Group C reflected on from whose perspective the text was written. We found this reflection very interesting, and, in our opinion, it testifies to a profound insight into text creation and the communication of texts. Therefore, we believe that the students in this example show student agency and that learning situations like these should be encouraged.

By looking back at the process, the students' contributions to model development can be summarised as follows: They contributed by testing the model in action on limited material, and they asked critical questions. They also helped us clarify that a multimodal analysis must be combined with social theory to understand the meaning. In the case of this study, we applied the theory of social semiotics. Depending on the aim of studies or essays, other theories can be combined with multimodality, such as gender theory or a norm-critical perspective. This did not represent new knowledge to us, as we as we are familiar with social semiotics theory, but when the students used the model, it became clear that support was needed in the form of examples regarding theoretical groundings. In line with the study by Garcia et al. (2018), students wanted to be part of the process. However, in contrast to the same study, students in our study highlighted shortcomings and offered suggestions for improvements. In fact, those suggestions helped us move further along in the process. Like Garcia et al. (2018), students were not involved in setting the goals of the process, which can be understood as students achieving less agency. Involving students from the beginning would perhaps have been more productive and could have offered the students more agency in the research process. When developing the first version of the model, our intention was that it would be easy to work with, but we realised that it was far too concise and thus not as supportive as it could be. A challenge that is well known from other studies using a design approach (Anderson & Shattuck, 2012; McKenney & Reeves, 2013; Vanderhoven et al., 2015) is that researchers often experience dissatisfaction with their final design results, and we too found it difficult to be satisfied with the fourth version of the model in this study. We discussed whether to perform additional design cycles to gain more knowledge and to make the model usable in a broader sense, including adjustments for various subject content, such as mathematics education, for instance. We do not view the model as a final product but as a model that can be developed further and changed, and we therefore refer to it as the current version.

The present study provides examples of how students are given agency in a learning situation through design *in* learning. Trowler (2010) highlights the benefits, as reported by the students themselves, the researchers, and the teachers, of involving students as co-creators in higher education, which is also supported in this study. Trowler (2010) and Barnett (2007) contend that the students are given agency according to their own learning in this kind of process. Furthermore, it is not only student learning that is made visible but also their capacity in learning to learn (Engeness, 2021). It is both interesting and important that students are offered the opportunity to participate in learning situations where their own learning is made visible. This is especially important given that the students in this study plan to become teachers with responsibility for their students' learning processes. Teaching that offers students the opportunity to discover their own learning is thereby useful in their development process as they become teachers. We believe that when students participate in learning situations where they achieve agency, opportunities to create such learning opportunities for their future students may increase.

6.2 Contribution of the design process to the understanding of theory in essay writing

Two perspectives on students as co-creators of a theory-based analytical model were identified. The main perspective implied that students helped elaborate on and develop the model. The second perspective meant that it seemed evident that the students' theoretical understanding was developed when they elaborated on and used a theory-based analytical model. Discussions about the model and working with the model made the students understand more about a theory's use and the work process applied when analysing multimodal texts. In this case, the theory of multimodal social semiotics was used as an example of applying theory in essay writing. The theory was put to use, and the students could compare how different groups used the model. This provided a breadth of perspectives regarding how the model could be applied, which showed the variation of the model and further contributed to learning.

The inclusion of students in the model development process provided greater insight and allowed us to realise that certain crucial aspects were missing in the model. These were more profound aspects, such as whose perspective and whose interests were presented in the texts. From a social semiotic perspective, those aspects are basic assumptions (Kress, 2010). This made us realise that we had initially focused more on the multimodal aspects, and the first version of the model can be interpreted as having a greater emphasis on the text's *form* than its *content*. This led us to develop

the model further, as we wanted the model to be a tool for analysing the whole text, including aspects of form, content, and functions of texts (Insulander et al., 2017). The exclusion of aspects of content can, as we see it, be seen as support for Kress's (2010) explanation of multimodality and the need for complementing it with social theory, as well as the view that it cannot be seen as a theory on its own. In this study, the social theory used was social semiotics.

The process has also involved both new insights and learning for the authors. In addition to a novel design in which students are invited into a process that demonstrates the role students can play, this process also reveals our own learning. After being a part of this process, we understand the model in a new way. If we had not been part of this process, this would not have been made visible to us, and the model would not have developed in the way it did. Initially, our assumption was that the model (version 1) would be easy to grasp and use, but that was not the case. The working method could be described as an undulation, both conceptual and procedural, in an alternating interaction between students and authors, something we have much appreciated. With this new knowledge, we see that involving students offers tremendous benefits. The students have assumed the role of active agents and have been involved in both the development of the model and in creating the content of the teaching, which is very positive. Here, our view of knowledge and learning as something socially constructed also becomes visible.

7. Concluding remarks and implications

Finally, we conclude that by applying a design process similar to what is described in this paper, students can be offered the opportunity for student agency and gain a deeper understanding of the content, for instance, theory's role in essay writing. Furthermore, a joint exploration between students and teachers is made possible, which is a rewarding experience that contributes to the development and learning of all participants. The model has been tested and adjusted, culminating in the current model, version 4. The entire process of developing and refining the analytical model together with students resulted in a model that can be used by researchers and students in the process of analysing multimodal text, although with adjustments to fit the purpose of the respective analysis depending on the type of text. All in all, this implicates that teaching with an awareness of

agency and joint exploration where students are made co-creators is a beneficial approach when planning and implementing higher education teaching.

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