UNIVERSITY OF GOTHENBURG

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Sensory activation at a distance

Evaluating multisensory exercises and examinations as a means to increase student engagement online

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Supervisor:	Ingrid Henning Loeb
Examiner:	Ann-Marie Eriksson

Abstract

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Purpose: This study aims to critically evaluate and analyze the integration of multisensory learning activities in online teaching from a student engagement perspective. Analyzing a case study in art history, it endeavors to contribute to the understanding of sensory activation as means to increase student engagement in online teaching.

Theory: A framework of student engagement theory and collaborative learning was used, from the Student Engagement Model (Dixson, 2010, 2015; Handelsman et al., 2005) and the Community of Inquiry framework (Garrison, 2017; Garrison et al., 2000, 2010).

Method: A mixed methods approach was used, combining quantitative descriptive statistics and qualitative thematic analysis.

Results: Results show that sensory engagement is effective to increase student engagement online, and contributes to perceived presence, and collaborative learning. Sensory activation entails variation and interaction, but also stimulate new ways to experience the world, and subsequently new ways of thinking.

Preface

I would like to extend my warmest thanks to Ingrid Henning-Loeb, my supervisor, who has been incredibly helpful and encouraging throughout the process of conducting this study and completing the thesis project. Thank you for interesting discussions and insightful comments.

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I am deeply grateful for the enthusiasm and curiosity of my students, who bravely engaged in this multisensory course, and who generously shared their thoughts and ideas about multisensory activation, online and in real life.

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Introduction

Research problem

During the last decades, there has been an increasing interest in acknowledging the importance of all sensory input, also when analyzing (seemingly) visual objects (Classen, 2017; Heywood, 2017; Howes, 2006, 2022). The theoretical foundation for this *sensory turn* is the realization that visual objects can activate emotional and sensory responses, and that images seldom are purely visual (Duncum, 2004; Mitchell, 2005). In art history, this is an established knowledge, rarely spoken of but integrated in art historical practices such as excursions to study original artworks on site, or city walks to discover architecture through embodied experience. In a digital age when art is increasingly consumed and studied online, in virtual museums and on media platforms such as google art project, the multisensory understanding of art is perhaps more important than ever. This formerly *silent knowledge* needs to be discussed, theoretically framed, and applied through practice in art history education (Bacci & Melcher, 2013; Di Bello & Koureas, 2010; Hunter-Crawley & O'Brien, 2019).

The empirical material in this study consists of an advanced level online course in art history in which I was the teacher and where I added a series of multisensory learning activities to the curriculum. The inherent paradox of teaching an online course about multisensory art triggered a critical question: how could I, in this course, bridge the distance format and create a course structure that not only theoretically taught students about multisensory aspects of art, but also trained them in practice, and helped them conquer a new way of thinking about, experiencing, and describing art, in contact with the art objects themselves? This first question illuminates a more general problem: How can teachers create a learning environment in online courses where presence and student engagement help optimize learning experience?

Multisensory art history is an increasing research field where new theory and methodological interest combine to demonstrate sensory impact on the understanding of art objects, contemporary as well as historical. The pedagogical implications of the sensory turn are less researched, and there is a need for empirical studies and critical evaluation of multisensory strategies in art history education, as well as other disciplines (Marshalsey, 2023; Rose & Hedrick, 2018). A multisensory approach to teaching and learning in higher education is also about the learning environment, student engagement and activation in general when multiple senses are used throughout the course (Kress, 2010; Kress & Van Leeuwen, 2020; Purinton & Burke, 2020; Sinclair, 2018). Activity, variation, and interaction are proposed as means to engage students and create meaningful learning experiences (Arthurs & Kreager, 2017; Biggs & Tang, 2011; Dixson, 2010, 2015; Garrison 2017; Garrison et al., 2000, 2010). More specifically, several studies indicate that an active use of the senses can increase perceived presence, and that discussing the experiences with the educator and other students will contribute to engagement and collective learning (Cesari, 2021; Heinrichs, 2021; Newman, 2019; Rose & Hedrick, 2018).

Since the pandemic, there is an increasing interest in online education, and research indicate that activation and variation may have impact on social presence and learning communities online and increase student engagement. Although student engagement is well known and has been discussed for quite some time (Garrison et al., 2000, 2010; Handelsman et al., 2005), the research field of online student engagement is still developing (Cleveland-Innes & Garrison, 2021; Martin et al., 2022; Vezne et al., 2023), and few studies have been conducted on art history education in an online environment.

In sum, the general hypothesis that drives this study is the idea that more engaged students are better learners. The above observations are the starting point for the aim and research questions in this study about sensory activation in online education. Further understanding of how multisensory learning activities may affect both aspects of presence and levels of engagement in online art history education will also, on a more general, level contribute to research on multisensory approaches to student engagement online in higher education. Consequently, this research problem can be approached from

two directions: from an art historical perspective where the multisensory understanding of visual art can be discussed as a primarily methodological problem, and from a higher educational perspective where theoretical discussions of collaborative learning and student engagement frame the problem. To address the art historical perspective, the above-mentioned course, an advanced level course about multisensory aspects of art was developed: *KV5016 Sensing Art*, 7,5 credits, second cycle, 50%, online. In addition to the theoretical course theme, multisensory exercises and examinations were integrated in the course to increase student activation and encourage application of theoretical knowledge in practice. The goal of this multisensory approach in the course was twofold: 1) to train the students in systematical description and analysis of art objects with all senses, and 2) to activate and engage online students through multisensory exercises and learning activities.

To address the higher educational perspective, this study analyzes the implementation of multisensory activation, and the perceived engagement of the students in the course. The focus of the study is on the multisensory learning activities, that were designed specifically for this course. A framework of Community of Inquiry and student engagement theory has been applied to evaluate and analyze the use of multisensory activation in online education in the broader context of higher teaching and learning.

Aim and research questions

This study aims to critically evaluate and analyze the integration of multisensory learning activities in online teaching from a student engagement perspective. Analyzing a case study in art history in relation to a framework of collaborative learning and perceived presence, the study endeavors to contribute to the understanding of sensory activation as means to increase student engagement in online teaching.

The study seeks to answer the following research questions:

- In what ways does the integration of multisensory learning activities in an online course impact students' perceived level of skills, participation, emotional and performance engagement?
- In what ways does the integration of multisensory learning activities in an online course affect aspect of social, teaching, and cognitive presence?
- In what ways do the findings support and/or contradict multisensory activation as means to increase student engagement in online education?

Literature review

The research field of this study is located at the intersection of areas such as multisensory teaching and learning, sensory activation, multimodal pedagogy, student engagement and collaborative learning (further explored in the theory section), and distance education. In this literature review, I give an overview of the field, focusing on aspects of multisensory teaching and learning in higher education, leading to a more specific section on the application of multisensory pedagogy in the field of art history education. Multisensory perspectives are not a focus for higher education only, but I will not go into the large body of existing research on the role of the senses in education for children.

Multisensory approaches and activation in higher education

A *multisensory* approach to education means engaging the senses with a variety of activities and materials to stimulate the students' cognitive abilities in the learning process. "The senses" are often understood as the most commonly used five senses: vision, hearing, touch, taste and smell, but could potentially also include other senses such as balance, memory, sense of orientation, sense of temperature etc. (Howes, 2006, 2022; Jütte, 2005; Smith, 2007). A *multimodal* approach structures learning materials in different modalities, such as text, image, sound recordings etc. (Kress, 2010). "Text" and "image" are different modalities, activating linear, and spatial thinking, respectively (Eriksson & Göthlund, 2023; Kress & Van Leeuwen, 2020) but both modalities are engaging the sense of vison. "Film" is one modality, but engage different senses: primarily sight and hearing, but secondarily also other senses through activation of sensory responses and memory (Marks, 2000; Mitchell, 2005) – seeing someone cooking, for example, will stimulate memories of smell and taste. Both approaches operate on the premises that students have different learning abilities and preferences, and that a variation of learning activities will increase student activity and engagement and enable better learning. Both concepts are often used in combination.

Synthesizing literature on *active learning*, Arthurs and Kreager (2017) advocate a perspective where active learning means learning through activities and discussion, actively constructing knowledge, as opposed to *passive learning*, focusing on information, and learning through listening to the teacher. They show that active learning promotes positive learning outcomes and detect a growing interest in implementing active learning strategies in classroom tuition. The authors focus their study on college teaching in the science field and subsequently draw general conclusions about the need for overall awareness of the benefits of active learning within the broader field of education. Based on a theoretical framework of constructivism and social independence, they conclude that "Deep learning and construction of knowledge is facilitated when individuals have the opportunity to actively engage with the subject matter as well as with other individuals" (p. 2075). Their findings point to the benefits of breaking passive learning situations and create a learning environment based on variation, as well as implementing group-oriented activities to increase student interaction. Multisensory/multimodal approaches advocating a more diverse learning environment, and striving to increase student activation and interaction, are well aligned with research on active learning.

Biggs and Tang (2011) discuss student diversity and the crucial role of active teaching methods in outcome-based education, as a means to cater for the diversified learning abilities of the student population. They show how active learning strategies could bridge the difference in student commitment, background, and engagement. Presenting the conceptual framework of *constructive alignment* (further discussed in the methodology section) they show how intended learning outcomes could be formulated as activities rather than passive knowledge and assessed based on these criteria. They write: "The underlying principle is that the assessment tasks should comprise an authentic representation of the course intended learning outcomes" (p. 191). When the outcomes are formulated using *active verbs*, this means that exercises and exams should be designed in the same way: as learning *activities* and assessments of student ability to *perform* the intended activities.

The importance of *interaction* is researched by Swan (2002), who finds that student satisfaction and results in online education depend on clear course structure to facilitate interaction with course content, active interaction between teacher and students, and equally active interaction among the students. The prerequisites for successful e-learning are discussed by Garrison (2017), who states that while online technology offers opportunities to access information at any time, and connect with others regardless of location, meaningful e-learning must also factor in the constraints of moving education online if collaborative learning communities are to be sustained online. Put differently, successful e-learning is about pedagogy and communication, not technology. Garrison outline the four basic learning activities as *listening, talking, reading*, and *writing* (pp. 110–111). In traditional face-to face classroom teaching, focus is often on listening and reading, leaving little room for the all-

important dialogue. In an online environment, the conditions for these activities change: a dialogue can be carried out asynchronously in a chat, and the communication is no longer confined to the narrow time frame of the lesson. As Garrison puts it: “In this way the blending of verbal and written communication can move academic discourse to another level in constructing meaning and confirming understanding” (p. 111). In other words, online environment, the basic learning activities gain new possibilities, and the focus may change towards dialogue and collective learning processes.

Cleveland-Innes (2021) finds that “the post-industrial approach to distance education is a transforming factor in higher education; fundamentally reconceptualizing, restructuring, and significantly reshaping the teaching and learning transaction” (p. 4). What she means, is a change from an earlier view where distance education was teacher-centered and focused on the transaction of information, to a student-centered online education of the 21st century with a focus on collaborative learning. Swan (2021) advocates the same view and points out that classic distance education was based on a theoretical foundation of behaviorist and cognitive psychology, while distance education of today rather turn to constructivist learning theory. Online learning in the later sense has a more pronounced focus on learning environment and students forming a community, rather than as individual learners only. This, according to Swan, underlines that the Community of Inquiry framework is suitable for understanding and planning contemporary online education.

The importance of activation, variation and a multisensory approach to increase engagement and learning in higher education are supported in several studies. Among those, Newman (2019) for example, shows how multisensory study support helped overcome learning difficulties in a diverse student population in medical studies. He suggests that a broader knowledge of multisensory techniques can help create more diverse, and inclusive education, also for students with special learning disabilities such as dyslexia. Heinrichs (2021) demonstrates how teaching sustainable development using a sensory approach could increase student engagement and develop skills “to engage creatively for sustainable transformations” (p. 1). In collaboration with artists, the author developed three experimental courses with a multisensory and artistic approach to sustainable development, open to students with a background in environmental studies, cultural studies, and social sciences. The artist-academic co-teaching stimulated new learning activities, such as filmmaking, creative workshops, and sound art, highlighting sensory aspects and embodied understanding of the field. Heinrichs conclude that from a student-centered perspective, the results were encouraging, but to fully understand the impact the experimental course design, further studies are needed. Jayagopalan and Mukherjee (2022) discuss direct embodied experience for learning purposes and conclude that spatial and conceptual learning in urban studies is enhanced when students experience real-life engagement with urban environments. Students were encouraged to understand the cityscape as an “urban sensorium”, thus activating all senses, and then created portfolios of their learning experiences. The authors conclude that the pedagogical implications of the strategy were successful and suggest further research to investigate the long-term effects.

A multisensory approach is also applicable in an online setting. Cesari et al. (2021) suggest multisensory stimulation using AR/VR technology in virtual, augmented, or mixed reality situations to create a feeling of presence and social involvement in online education and counter potential negative effects of disconnection, boredom, and distraction during the pandemic. They acknowledge the difficulties with the technical infrastructure of such a course design, since not everyone has access to this technology, but conclude that the technique holds potential to enhance the learning experience. Purinton and Burke (2020) on the other hand explore a hands-on reality experience and show how they were able to increase student activity, interaction and engagement in an asynchronous online course when adding exercises that engaged multiple senses. Online students in a marketing course were tasked to create promotional videos for food, and to use all senses in the process. The foodstuffs were distributed via mail to the students, to experience in real life. Online courses risk that physical distance reduces the ability to fully interact between students, and with an asynchronous schedule, even more

so. Purinton and Burke conclude that the hands-on exercises lead to sensory activation and increased the students perceived engagement levels, and sense of community.

The literature indicates that a multisensory approach to education, on campus or online, may help to create presence and engage students in embodied understanding, and that discussing the experiences with the educator and other student will contribute to a sense of community and collective learning.

Multisensory aspects of art history education

Since the 1990s, an increasing focus on the impact of complex sensory input has developed in the humanities, also when researching seemingly visual objects and phenomena within art, culture, and media (Classen, 2017; Heywood, 2017; Howes, 2006, 2022). Often referred to as the *sensory turn*, it builds on the theoretical concept that visual stimuli will activate emotional responses, and memories of previous sensory experiences. It follows, then, that images and other "visual" media are never purely visual but should be understood as the starting point for sensory activation in multiple ways (Duncum, 2004; Mitchell, 2005).

Art history as a discipline has a well-developed theoretical and methodological framework for visual analysis. The focus has first and foremost been on the visual impact of art (Bagnoli, 2017; Duncum, 2004; Eriksson & Göthlund, 2023; Mitchell, 2005). At the same time, art historians have a strong tradition of sensory based practices, excursions, and study visits, based on the often unspoken knowledge of the importance of experiencing art objects in real life to activate an embodied understanding of size, place and materiality. During the last decades, a renewed interest in the traditional practices and methods, and in new ways to theorize sensorial impact of art objects and multisensory art experiences, has evolved under the influence of the sensory turn and the subsequent focus on sensory activation (Bacci & Melcher, 2011; Di Bello & Koureas, 2010; Harvey & Mullett, 2017; Hunter-Crawley & O'Brien, 2019; Lauwrens, 2012).

Art, media, and cultural experiences are complex systems of communication, seldom purely visual. To be able to understand and decode the complexity, Duncum (2004) discusses the need for a broader approach to teaching and learning art and proposes a perspective open to multisensory communication. He argues for "the making of meaning through the interaction of different communicative modes" (p. 253). The concept encompasses a multimodal framework for understanding complex communication modalities, and their mutual interaction. A similar argument concluding that visual experiences also include the activation of other sensory cues, is put forth by Mitchell (2005). He links his discussion to the broadening of the art history discipline into the field of visual culture, as he writes: "Visual culture at its most promising offers a way to get beyond these 'scopic wars' into a more productive critical space, one in which we would study the intricate braiding and nesting of the visual with the other senses, reopen art history to the expanded field of images and visual practices which was the prospect envisioned by Warburgean art history" (p. 265), thus linking his argument to an older tradition in art history, where an embodied understanding of art was discussed by scholars such as Aby Warburg, hence "Warburgean" (Becker, 2013).

In other words: visual analysis is not enough, nor is tactile analysis, materiality analysis, scent- and taste analysis or sound analysis – if performed separately. To fully understand art, and in a broader sense, culture, and media, we also need to understand how the communicative sensory cues interact. A multimodal and/or multisensory approach to art leads to an understanding that also seemingly visual images have potential for sensory communication beyond the first impression.

Specific studies show how it could be done in practice. Rose & Hedrick (2018) describe how they managed to increase student interest in medieval art history by adopting teaching strategies focusing on multiple senses to their subject. Their new approach encompassed multisensory framing of

artefacts, as in discussion of the religious use of artefacts, readings focusing on sensory aspects of the object, or practice-based art-making classes to "help students engage more deeply with icons" (p. 15). They also arranged study visits to museums as a follow-up activity, and object-based learning experiences where student could actively engage with authentic objects, thus activating the sense of touch in relation to the course content and paying close attention to sensory and materiality aspects of the artefacts. They conclude that: "A fuller understanding of medieval art, sacred or secular, may be gained through actively exploring aspects of its original sensory context, which also can result in improved student interest and performance as they use their own senses to participate in class activities" (p. 2). Marshalsey (2023) focuses on design education in a practice-oriented study with a theoretical framework also applicable on higher education in general, through the lens of creative learning spaces and student engagement. She discusses sensory affect, the impact of sensory engagement with educational environments, and finds that design education, also online based, needs to be playful, experimental, and hands-on to engage students and spark creativity. The same way of thinking could be applied, with a broader aim towards higher education in general. Marshalsey concludes that abstract and conceptual education benefit from sensory exercises, embodied experience to create deeper levels of cognition by connecting mind and body.

These studies give examples of multisensory learning activities when teaching art history and design and demonstrate the interest for new strategies and the need for further research in the area. It seems clear that sensory activation, exercises and learning activities with a pronounced multisensory approach, can have a positive impact on student engagement, but few studies in the discipline tries to measure results or discuss in what ways the activation works from an engagement perspective.

Summary

The literature points to the benefits of adopting multisensory and/or multimodal approaches, as a pedagogical means for better understanding of art and art historical objects. From an educational point of view, previous research indicates that a variation in modalities, or in types of sensory activation is beneficial also for activating students, increase student engagement, and potentially lead to better learning. In an online environment, learning activities focusing on sensory activation, and the sharing of these experiences in dialogue with teacher and other students, holds a potential to also increase student interaction and counter a perceived isolation in distance courses where students never meet in real life. But are these beneficial factors possible to critically evaluate and measure? Some suggestions are made, but the findings still open for further empirical studies, as to the effects of new multisensory activities in the curriculum. The pandemic triggered a wide-spread interest in online education, and studies show that activation and variation may have impact on social presence and learning communities online, and supposedly also increase student engagement. There is, however, a need for further research on student engagement online, and very few studies have been conducted on art history education in an online environment.

The research questions in this study builds on these observations, and particularly focus on how sensory activation works in regard to student engagement and perceived presence in online education. Understanding in what ways the multisensory learning activities affect both aspects of presences and level of engagement in the course add to the specific field of art history education, but also on a more general level, to pedagogical research on multisensory approaches to student engagement online.

Theoretical framework

Student engagement

Student engagement can be defined as "the extent to which students actively engage by thinking, talking, and interacting with the content of a course, the other students in the course, and the instructor" (Dixson, 2015, p. 144). Azevedo (2015) shows that *engagement* can be understood in multiple ways, and tries to chart the concept as a theoretical, methodological, and analytical instrument within the educational, learning- and psychological sciences to demonstrate the variety of approaches in the different fields. To avoid the multitude of possible meanings in this study, I use the above definition from Dixson (2015). As pointed out by Coates (2007), student engagement "is a broad construct intended to encompass salient academic as well as certain nonacademic aspects of the student experience" (p.122). Handelsman et al. (2005) state that research generally agrees that engaged students are good learners, and that it would be useful to be able to understand, and measure student engagement. At the time, such research was scarce, and they made a first attempt to measure classroom student engagement among college students. Their findings presented a new way to understand student engagement, based on four factors: skills engagement, emotional engagement, participation/interaction engagement, and performance engagement (pp. 186–187). All four factors are important aspects of student engagement, and the findings support the view of student engagement as a multidimensional phenomenon, including both affective and behavioral components. Dixson (2010, 2015) later developed this model into a measuring scale for online student engagement, The Online Student Engagement scale (OSE), designed to aid research about online course design, and as a tool to provide feedback about the level of student engagement in online courses.

Skills engagement is defined as "student engagement through practicing skills" (Handelsman et al., 2005, p. 186). Activities in this category could be specific, such as taking notes in class or reading the course literature, or general such as being organized. In an online environment, skills engagement could be specified as taking notes from Power Points or video lectures or looking over notes before getting online (Dixson, 2015, p. 157). Student effort and skills correlates positively to engagement in a course, and to student achievement (Purinton & Burke, 2020). When the online learning environment is designed to support skills and independent learning, students are more willing to learn and feel a higher level of engagement (Ong & Quek, 2023).

Emotional engagement is defined as "student engagement through emotional involvement with the class material" (Handelsman et al., 2005, p. 186). It involves activities such as applying course content to life outside class, or feelings, such as desiring to learn the material. Online, emotional engagement might encompass enjoying online chats, with instructors or other students (Dixson, 2015, p. 157). An important factor for emotional engagement is the degree of personal relevance that students feel towards the course materials. Ong and Quek suggest that students that "were encouraged to think critically and to think of ways to apply their concepts and skills into their daily lives" were more likely to feel engaged (p. 691). Students who engage with the course material, enjoy what they learn and can relate the material to their own lives are better learners (Purinton & Burke, 2020).

Participation/interaction engagement is defined as "student engagement through participation in class and interactions with instructors and other students" (Handelsman et al., 2005, p. 187). This includes activities such as asking questions, participating in discussions, or helping fellow students. Dixson later shortened this to *participation engagement*, and online activities in this category could be participating in online chats, or posting in the discussion forum (Dixson, 2015, p. 157). Students often report that they enjoy interacting with fellow students in discussions and group work. They also value conversation with teachers during lessons or seminars (Ong & Quek, 2023). Students who perceive a sense of belonging to the group are more likely to experience meaningful learning. Social interaction with both fellow students and teachers are equally important in this regard (Purinton & Burke, 2020).

Performance engagement is defined as "student engagement through levels of performance in the class" (Handelsman et al., 2005, p. 187). The category includes achievements such as doing well on tests or getting good grades, but also feelings, such as being confident about doing well. Online, this category could mean performance such as doing well in quizzes (Dixson, 2015, p. 157). Performance engagement is linked to achievement, and Purinton and Burke (2020) highlight that the student's own desire to perform well is essential and suggest that "creating suspense and excitement for a novel project in a course should increase students' desire to be successful" (p. 31). Ong and Quek (2023) note that an educational approach focusing on student-centered collaboration might need increased teacher communication in an online environment, and that students might need further support in developing critical thinking online, potentially posing a threat to their performance engagement.

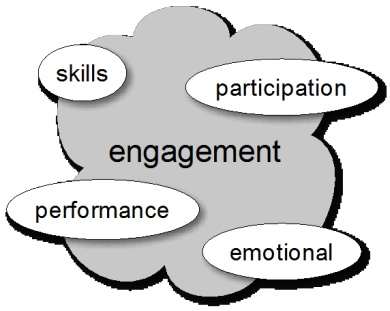

Figure 1: *Affective and behavioral components of engagement (Dixson, 2015, p. 146)*

All four categories together make up student engagement and interact to create a whole. Coates (2007) finds that student engagement is dynamic, can have different styles (intense, collaborative, passive, or independent) and vary over time. Vezne et al. (2023) examine student engagement from a motivation perspective, and propose that skills-, participation- and emotional engagement are dependent on intrinsic motivation (inner desire to learn), whereas only the performance engagement depends on extrinsic motivation (outer pressure). Dixson (2010) notes that student engagement builds on good communication, and that "it is not about the type of activity/assignment but about multiple ways of creating meaningful communication between students and with their instructor – it's all about connections" (p. 8). Her conclusion is that collaborative work between students, and strong instructor presence are imperative to increase engagement. Martin and Bolliger (2018) show that student engagement improves student performance and desire to learn and increases student satisfaction. They examine student perception on different engagement strategies in online education, and find that students value variety, as in a broad selection of learning activities, but that the most important factor for engagement is communication with the teacher. They claim: "It is important to note that the engagement strategies that support interactions with instructors were valued more than strategies that aimed at instructions with learning material and other learners" (p. 218). Ong and Quek (2023) highlights teacher support, as well as interaction and collaboration with other students as key to build engagement online. They also point to technical skills (as in general computer usage) as a determining factor contributing to student engagement in online courses.

Capone and Lepore (2022), among many others, discuss the perils of distance education in the wake of Covid-19, when education was forced to move online with very little time for preparation. They highlight perceived isolation as a risk for lower engagement and show that "students tried to make up for the physical presence by trying to interact constantly on the e-learning platform forum" (p.1281). They also conclude that students' states of mind influence their level of engagement, and that learning activities and course design, experienced as realistic, practical, and guided will enhance engagement online (p. 1281). Martin et al. (2022) emphasize the need for variation online and advocates a variety of formats (synchronous and asynchronous), as well as active encouragement of student participation, both formally (in activities and assignments) and informally, to build engagement. Cole, Lennon and

Weber (2021) emphasize that student level of engagement is related to interaction with other students, and to participation in active learning practices. Engaging in the learning activities and forming social bonds with fellow students help bridge a sense of isolation. They conclude that teachers play an important role, stating that an "online learning climate that fosters peer communication and collaboration are course elements over which instructors can provide much influence" (p. 878). Böheim et al. (2018) examine how teacher discourse might influence student engagement, and report that a change towards a more dialogic discourse practice (actively encouraging students to participate, to listen to each other, and to sharing ideas) correspond to higher levels of perceived activation and engagement among students.

In this study, I employ the concept of student engagement as a complex phenomenon, encompassing both affective and behavioral components. The concept helps to theoretically discuss and understand the diverse aspects of engagement, and as an analytical framework explores the ways these aspects are affected by the specific learning activities that constitute the empirical materials in this study.

Community of Inquiry (CoI)

Dixson (2015) discusses similarities between the Student engagement model and the Community of Inquiry (CoI) framework, and finds that CoI offers a strong perspective for understanding student engagement in online courses. The Community of Inquiry framework as a theoretical model for learning was launched by D. Randy Garrison, Terry Andersen, and Walter Archer (Garrison et al., 2000). In a retrospective article (2010) Garrison et al. discuss the framework, its development, and implications. The Community of Inquiry model builds on the idea that meaningful production of knowledge is a collaborative and ongoing process. The student's educational experience depends on three types of presence, all of which are required to optimize learning: 1) Cognitive presence, as in students' ability to create knowledge, individually and together; 2) Teaching presence, the teaching structure, and the framework for learning with the teacher as a guide; and 3) Social presence, students' social interaction and sense of belonging in the group. Deep and meaningful learning will happen when all three presences are integrated and active (p. 6-7). The concept of deep learning, often contributed to Marton and Säljö (1976), "is characterized by the student's will and intention to realize an understanding of the study material in order to relate it to a larger context" (Bälter et al., 2013, p. 2). Originally designed for "exploratory and descriptive studies", The CoI framework has, according to the authors, since developed to include both quantitative approaches and "the perceptions of learners and their experience of the three presences" (p. 8). Garrison later points to the firmly established use of the CoI framework in educational research and practice, and notes that "collaborative approaches to thinking and learning have become an educational focus" (Garrison, 2017, p. x).

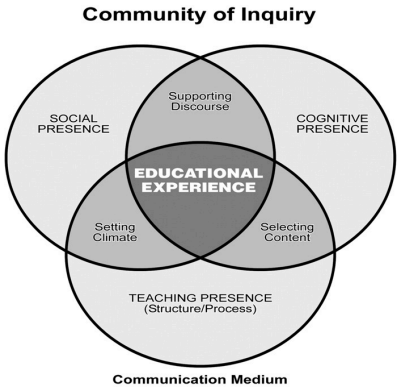

Figure 2: *The Community of Inquiry framework (Garrison, Andersen & Archer 2010, p. 6)*

The causal relationships between cognitive, teaching, and social presence are explored by Garrison, Cleveland-Innes and Fung (2010). They show that 1) teaching presence has significant influence on social presence, and 2) teaching and social presence have important influence om cognitive presence, thus concluding that all three presences are linked, and that teaching presence in highly important to set the scene for a collaborative learning environment (pp. 33–36). Their findings show how the relationships between the presences are dynamic, rather than stable.

Teaching presence online is created through a combination of organization and communication. Swan (2021) points to the importance of providing three parts: *design and organization* (clarity of goals and expected outcomes, and course organization and activities), *facilitating discourse* (enable online discussions with a supportive approach), and *direct instructions* (oral and written instructions and feedback) from the teacher (pp. 81–82). This illuminates how teaching presence is achieved by combining a clear framework with personal communication.

Social presence might be a challenge, using an online teaching format, where students and teacher only meet on zoom and never physically see each other on campus. How can social presence and a sense of community be achieved in distance education? For social presence to develop online, *affective expression* (as in students' abilities to express their personalities and to share experiences and values) is important, and dependent on *open communication* (a social climate where students feel free to share) and *group cohesion* (a sense of collaborative belonging and working together) (Swan, 2021; Vaughan, 2021). Communication and social climate build social presence.

Cognitive presence within the CoI framework is often discussed as a 4-step process: *triggering event* (a problem or an experience that triggers interest or curiosity), *exploration* (where the student further explores, seeks information and makes sense of the experience), *integration* (a reflective phase where the student integrates and conceptualizes the experience), and *resolution* (the final phase where the experience is explained, or the problems solved) (Garrison, 2017; Swan, 2021). The full process can be completed through a series of different learning activities. McCarroll and Hartwick (2022) investigate how cognitive presence can be obtained online, through all four phases, and find that all three presences are interdependent: to build a working cognitive presence, teachers need to facilitate strong social and teaching presence. A social climate where students can build relationships, and a sense of group cohesion, is crucial to the cognitive presence, particularly in the first two phases.

In this study, I apply the CoI framework to further explain how, and why, student engagement is affected by the diverse aspects of presence, and the learning processes associated with them. Student engagement is dependent on both activities and social relations, and the CoI framework helps to clarify the complexity and interdependence of perceived presence in relation to engagement.

Methods, procedure, and ethical considerations

Method and research design

Participants

The participants consist of students in the course *KV5016*, spring term 2024. All active students in the course (n=8) were invited to partake in the study. Student demographics: the group consisted of 8 students (2 male, 6 female), age: 25–75 (median age: 49). Level of former education: this was a second cycle course, so all students had minimum a bachelor's degree. As stated by Daniel and Harland (2017, p. 63) a useful questionnaire focuses on the most important questions, avoiding too many demographic questions, easy to collect but with no bearing on the research aim. In this survey, age and gender were not factored in since the population was too small for such an analysis, and age- or gender differences were not part of the primary research questions.

8 students were invited to the anonymous on-line survey (all students registered to the course, including one drop-out). Participants in the anonymous survey: 5 students (an answering rate of 62,5% of the total, and 71% of the active students). Participants in the group interview/ evaluating discussion: 5 out of 7 active students (71%). Since the online survey was anonymous, it is not known if the same 5 students participated in both the survey and the interview.

Exercises and examination

The study evaluates multisensory exercises and examinations designed for the course, one for each course theme. Students were asked to individually choose an example in each theme and conduct a multisensory analysis. The four themes were:

1) Multisensory aspects of exhibition design
2) Multisensory aspects of art
3) Multisensory aspects of scenography and performing arts
4) Multisensory aspects of design and architecture

In the exercises, students were asked to choose a contemporary example of the above themes, and to go out and make a field study *in situ* of their chosen example, carefully noting all sensory input experiencing the object. In their subsequent analysis of the object, they were asked to consider multisensory aspects of the experience, and to reflect upon how non-visual sensory input change or add to the visual understanding of the object. An example could be architecture: when looking at an image of a building, we perceive a visual understanding of structure, colour scheme, style period, proportions, and possibly visual appearance in relation to the surrounding area. When actually visiting the building, other sensory cues add to the experience: the sound and feel of our footsteps on hard marble flooring, the echo of voices in a large space, the smell of wood from wall paneling, the air flow from poorly insulated windows, the embodied sense of size in relation to the building, or perhaps even the taste and smell of smoke and cold soot when entering a room with a fire place. All these aspects are part of the experience, and will change, or add to our visual understanding of the building.

As a first step, the students prepared a PowerPoint and presented their example orally in class (live on zoom). As a second step, they wrote a theoretically anchored analysis of the same example, using the course literature and other relevant sources. The written text was also peer-reviewed by another student. In summary, the multisensory exercises each consisted of three parts: one oral presentation, one written analysis and one peer-review assignment of another student's text. The multisensory exercises focused on the explicit use of the non-visual senses hearing, touch, smell, and taste, in addition to sight during the process of analysis. The exercises were designed to a) activate all senses during the analysis of the artwork, and b) verbalize the effects of the non-visual senses, training the student in systematical analysis of artworks from a multisensory perspective.

The exercises were mandatory, and part of the course examination. In addition to the presentations and individual assignments, the students had a final exam of a similar design where they choose one of the course themes and further analyzed a chosen art object in relation to the course materials. The course design build on activating students outside the online environment, using all senses, and subsequently verbalize their experiences from "real life" in the online presentations, later to analyze and theorize these experiences in individual written assignments.

Procedure

The study can be seen as a *case-study* (empirical inquiries of single cases, contextually unique, addressing a problem of interest to the researcher's professional practice) if applying the definition suggested by Daniel and Harland (2017, pp. 42, 69–70). It combines qualitative and quantitative

research methods in a *mixed methods approach* (Daniel & Harland, 2017; Tight, 2019). This approach aligns with the overall aim of the study to evaluate student engagement from multiple perspectives.

Informed consent from students to partake in a research project is paramount (Daniel & Harland, 2017) and the students were carefully informed that the course evaluation was part of a pedagogical research project (this study). The information about the study was explained orally during the course introduction, and then a second time before the group interview. The information was also conveyed in the written introduction to the online survey, where it was clearly stated that participation in the anonymous online survey and in the recorded evaluation group interview was voluntary, and that participation meant giving consent to use the data in the pedagogical research project, and that all results would be anonymized before analyzing the data, and in the research report. Student awareness of the course being part of a research project is an ethical question, but also serves to heighten student attention to their own reactions and levels of engagement during the course, as well as trigger reflection on course design as well as course content.

Fieldnotes were taken continuously during the course in a thematic process-diary. The *online survey* was published on the student online portal Canvas after the final exam and stayed open for two weeks. An oral evaluation of the course was carried out as a group interview, after the final exam. The interview was recorded on zoom and transcribed. The transcript was then anonymized before the thematic analysis. All collected data was thematized, analyzed and discussed in relation to the theoretical framework and the research questions. Findings and conclusions are presented, including a metareflective discussion about the methodological approach.

Data collection

For data collection a combination of methods was used, to cover both subjective perceptions and objective results.

Fieldnotes/process diary

In this case study, I evaluate a course while teaching it, something that demands a methodological approach where changes and evaluation of activities are a reflective and circular process (Bjørndal, 2018, pp. 21–24). The integration of multisensory learning activities in the course are the activities and implemented changes that are studied and evaluated. To closely follow the course process and note student reactions to these exercises, and active student presence during the presentations, I used a process diary with semi-structured fieldnotes as a data collection tool.

As noted by Bjørndal (2018, p. 22) the research aim must never overshadow the pedagogical aim. I have chosen a mixed methods approach that would interfere as little as possible with the course. I used a process diary where reflections were noted after each lecture/seminar, and a pre-structured model to systematize the notes. In the first step, the notes consisted of *observations and description*, and in a second step the observations were subject to *reflection and analysis*. In the thematic process diary, I focused on the following themes (see appendix 2):

- Student questions/comments during lecture
- Student presentations
- Student interaction (questions/comments after other students' presentations)
- Content and level of reflection in written reports

Online survey

An anonymous online survey with a combination of qualitative (open ended) and quantitative (5-step Likert scale) questions was used (Daniel & Harland, 2017; Denscombe, 2021). To counter the halo-effect some questions were reversed (Purinton & Burke, 2020). The survey was designed as an extended course evaluation form with questions about the exercises and questions comprising student

evaluation of their level of engagement, adapted from Dixson's OSE scale (2015). The online survey was modelled on the original OSE-scale questions. Not all questions were applicable to the *KV5016* course, so the questionnaire used an adapted version of the OSE scale with questions from all four categories but adapted to course activities in the *KV5016* course design. Since the OSE-questions were a part of the regular course evaluation form, also including other questions, 8 OSE-questions were used to avoid overwhelming students with too many questions (Appendix 3). The question design allowed students to evaluate the statements in relations to their own feelings and experience of the course using a 5-step Likert scale (Yes, agree completely – Yes, mostly agree – Perhaps, agree partly – No, mostly don't agree – No, don't agree at all).

1. I really want to learn this material (Thoughts/emotions)
2. I put time and effort into my studies (Skills)
3. I participate actively with questions and comments (Participation).
4. Good grades are not important to me. (Performance, reversed)
5. I look forward to class (Thoughts/emotions)
6. I seldom read all course literature (Skills, reversed)
7. I give the other students constructive feedback and helpful comments (Participation)
8. Good performance in presentations and assignments are important to me (Performance)

The survey was published on the course online portal after the last mandatory course activity (final examination), to allow students to evaluate the entire course experience, including the examinations. The online survey stayed open for two weeks, and two reminders were sent out to all invited students (8). 5 students answered the online survey.

Group interview

A group-interview was conducted (Daniel & Harland, 2017; Denscombe, 2021). In a live zoom-discussion, students were asked to comment on the course, and on the multisensory exercises. They were encouraged to give constructive feedback both on strengths and weaknesses. The interview design was *semi-structured*, as in guided by the teacher/researcher from a series of preconstructed themes (appendix 4), but open to follow up on comments and new topics (Daniel & Harland, 2017; Denscombe, 2021). A semi-structured interview format was chosen to encourage dialogue and enable the following-up on student comments, also outside the pre-constructed list of questions.

5 students participated in the group interview. The interview, 37 minutes long, was recorded, using the zoom recording function, and saved as a sound recording (mp3). Before recording, a pre-interview briefing was given about the course evaluation being part of a pedagogical research project (this study), the ethical considerations of the study, how the data obtained would be used, and that all participants were free to leave the interview situation at any point (Daniel & Harland, 2018, p. 57). The recording of the interview was started after oral consent was obtained from the students to partake in the interview. The 37 minutes of sound recording was transcribed in detail, by the researcher (using no software for transcription). The student names were anonymized, using a random selection of letters instead of names, student X, student Z etc. After the anonymization, the interview transcript was coded and thematized (Nowell et al., 2017).

Qualitative evaluation of course results

Within the framework of the course, the individual presentations and the final exams were used to evaluate the course results and grade each student. For the purpose of this study, the overall results of the assignments and exams were anonymized and used as data to compare the course results *on a collective level* with similar courses of a primarily visual design, further explained below.

Analysis

The data analysis combines quantitative and qualitative methods, with a focus on the qualitative thematic analysis.

Quantitative results of online survey

The quantitative data from the survey is presented as descriptive statistics (Daniel & Harland, 2017; Denscombe, 2021). In this study, it means presenting the survey results in actual numbers and percentages, given the small number of participants (5), to give an overview of the results, and form a basis for the qualitative analysis. The survey was created on the online platform Canvas, using the Sunet Artologic survey system (provided by Gothenburg university) and the tools for statistical analysis in the program were used to provide the statistical analysis of the results.

Qualitative analysis of fieldnotes, survey and interview

The qualitative data from the survey and the group interview was coded and organized into relevant themes using thematic analysis (Daniel & Harland, 2017; Denscombe, 2021; Nowell et al., 2017). The thematized data was analyzed through the theoretical framework of student engagement and Community of Inquiry. To work with thematic analysis in a useful way, Nowell et al. (2017) point out that a methodical procedure is needed. Their insights have been an inspiration for this project and their systematic step-by-step approach has been adopted in the analysis of the data. The original OSE scale contains 19 items in four different categories. In the survey, questions from the different categories are presented in a mixed order. The four categories are 1) *Descriptions of thoughts/emotions* (for example desiring to learn the material, looking forward to class), 2) *Skills* (for example taking notes during class, being organized, reading all course literature), 3) *Participation* (for example commenting fellow student presentations in a helpful way, posting questions in the chat during lectures), and 4) *Performance* (for example doing well in assignments, getting good grades) (Dixson, 2015). In the OSE-scale, the categories are used as an interpretation grid to thematize the answers and thus measure student engagement. These four categories, measuring student engagement through self-evaluation, were used to create an overall thematization of the data. They were combined with two categories for evaluation of course design: 5) *course organization* (for example online teaching, study rate) and 6) *course content* (for example themes, literature). Student perspectives of the themes were measured through the anonymous online questionnaire, and the group interview. Teacher perspectives of the themes were measured through the process diary.

Qualitative analysis of course results

In addition to the students' evaluation of their own learning experience (student perspective), a qualitative evaluation of the course results on a collective level was conducted (teacher perspective) and compared to similar exercises primarily using a visual perspective. This analysis is an evaluation of the oral presentations, as well as the written assignments and exams, using *constructive alignment* in relation to the intended learning outcomes in the course syllabus. Constructive alignment (CA) can be explained as an approach to teaching and learning where the course design is dependent on the course outcomes. It means aligning learning activities and assessment to the outcomes in such a way that students can engage in learning activities and construct their own knowledge, and that the course as a whole ensures the achievement of all learning outcomes (Biggs & Tang, 2011, pp. 97–109).

Biggs and Tang discuss learning outcomes in terms of activities, how to actively use knowledge, rather than passively achieve knowledge: "The intended outcomes specify the *activity* that students should engage if they are to achieve the intended outcome as well as the content the activity refers to" (Biggs & Tang, 2011, p. 97). The intended course outcomes for *KV5016* are focusing on different activities related to the navigation of the multisensory art field. Knowledge and understanding, where the activities are to *show* in-depth understanding, and *show* insights in the research field. Competence and skills, where students are meant to *identify, formulate, and critically process* relevant problems, as well as *analyze* empirical material, *using* relevant methods. They perform generic academic skills when they *critically and constructively peer review and discuss* other students' texts. Judgement and

approach are activated when they *systematically problematize and critically engage with complex questions* in the field, as well as *balance* different voices within the field against each other, and *independently assess* empirical materials.

The learning outcomes stretch beyond knowledge. Education ideally aims to impact student perception and conduct the way they think and act, in a broader sense. As Biggs and Tang put it: "The theory in any subject is not meant to be 'understood', whatever that all-purpose word might specifically mean, but, as we argued in the previous chapter, it is intended to change the way students see the world, and thence to change their behavior towards it" (Biggs & Tang, 2011, p. 98). They specify that teachers are responsible for creating a suitable learning environment and stress the importance of evaluation of student performance and activity to ensure that the learning outcomes are achieved (2011). The evaluation of the course outcomes on a collective level in this study, using constructive alignment, follows this line of thinking and leads to a discussion about course activities on two levels: learning activities in the course (with a focus on multisensory exercises and examinations), and the activities they lead to, as intended learning outcomes (formulated through active verbs in the syllabus).

Strengths and limitations

The quantitative part of the survey gives an overview of the results. The qualitative part of the study allows nuanced answers and student comments not covered by the questionnaire. The research design allows the research project to run parallel to the course with minimal interference. Student answers might be tainted by *response bias*: answering towards what the teacher wants to hear, rather than what the students really think. The combination of anonymous surveys and a live group interview gives a more nuanced result and counters the risk of response bias. As a *case-study*, the result points towards conceptual areas of interest rather than a statistical survey of the field (Daniel & Harland, 2017). The survey measures the students subjective learning experience. The actual course results are evaluated by the teacher, but the results are only indicative (Dixson, 2015). Measuring actual difference would require a reference group of similar size with a course design without multisensory exercises.

Alternative methodological approaches

A vast selection of methodological approaches is applicable within higher education research, also within the limited field of student engagement studies (Christenson et al., 2012; Tight, 2019). Alternative methods considered for this study were individual interviews, participant observations and non-participant observations, as discussed below. Considering the options, within the framework of theoretical perspectives, aim and research questions, timeframe, and ethical considerations, none of these alternative methods were chosen, given available resources. *Individual interviews* were considered (Christensen et al., 2012; Daniel & Harland, 2017). In-depth individual interviews gain more nuanced data and the possibility to follow up on answers with all interviewees. The risk of peer-pressure in a group interview is minimized. Student dependence on teacher for course grades means risk for response bias. Individual students may feel exposed in a one-to-one interview situation. Individual interviews are time-consuming. Engaging all or a few of the students as *participant observers*, taking field notes during the course was an option (Christensen et al., 2012; Daniel & Harland, 2017). This method allows systematic observation of the course from start to finish, but takes students' focus from the studies and changes student perspective to research perspective: does the result measure the student experience if the student becomes co-researcher? Engaging an independent researcher to partake in the course as a *non-participant observer* was a possibility (Christensen et al., 2012; Daniel & Harland, 2017). It allows systematic notes about the course from independent source during the entire course period without engaging the students, but no coverage of the student perspective. It might be perceived as disturbing to students to be observed.

Ethical considerations and expected contributions

Ethical considerations

The study follows the guidelines for ethics in research and good research practice from the Swedish Research Counsil (Vetenskapsrådet, 2023). As stated above, all students were informed about the evaluation of the course being a part of a research project (this study) and that participation in the study required informed consent, and the right to withdraw at any time. Participation and answers had no impact on student grades. It was important that the students were informed, from the beginning, of the course being part of a pedagogical development project, and thus being the subject of research.

All collected data is stored locally on a laptop and on an external hard drive. All presented data in this study is anonymized and discussed on a general level, without names or details that might be connected to specific individuals. The study is registered according to the rules for processing of personal data for educational purposes at the University of Gothenburg.

As a researcher and also teacher in the course (the object of study), I acknowledge the risk of being too involved, and subsequently reading too much of my own beliefs about the course design into the results of this study. On the other hand, as the teacher in a small group of advanced level students, I know them all reasonably well and am, at least partly, able to understand also unspoken, or unclear statements during the interview based on former knowledge of said student. This, also, obviously, encompasses a risk of reading in what I expect, rather than what is meant in student statements.

An interview with students who know, and like, a teacher also holds a risk of students modifying their answers to suit what they believe the teacher wants to hear, or not hear (critique). To counter this risk, the anonymous online survey was used, to allow students to freely express their thought on the course experience, anonymously in a less personal setting. To encourage constructive criticism, both positive and negative, it was clearly stated in the oral information during the course that all opinions and suggestions were welcome, and that the course evaluations had no impact on student grades.

Expected contributions

Current research shows that multisensory activation is expected to increase students' level of engagement. This study seeks to critically evaluate how exercises can be designed to help students use all senses, to activate sensory awareness and verbalize the effect of these exercises. The study results are expected to contribute to existing literature by evaluating the use of multisensory exercises in an art history course, and on a more general level examine and explain the possible added value of multisensory activation in an online environment, from a student engagement and collaborative learning perspective in the broader context of higher teaching and learning.

Findings and analysis

Thematic analysis of survey, interview, and process diary

The survey contains questions from the four categories of the OSE-scale that measure student engagement through self-evaluation.: 1) Descriptions of thoughts/emotions (such as desiring to learn the material, looking forward to class), 2) Skills (such as taking notes during class, being organized, reading all course literature), 3) Participation (such as commenting fellow student presentations in a helpful way, posting questions in the chat during lectures), and 4) Performance (such as doing well in assignments, getting good grades). They were combined with two categories for evaluation of course design with impact on the former four categories: 5) course organization (such as online teaching,

study rate) and 6) course content (such as themes, literature). The first four themes correspond to emotional, skills, participation, and performance engagement (Dixson, 2015), and also affect the social, teaching and cognitive presences in the CoI framework (Garrison, 2017). The last two themes mostly affect the teaching presence. Student perspectives of the themes were measured through the anonymous online questionnaire, and the group interview. Teacher perspectives of the themes were measured through the field notes (process diary).

Anonymous online survey

The anonymous online survey was published in the course portal after the final exam. The specific OSE-questions were part of a larger course evaluation survey, focusing on course content, organization, and student engagement. 5 out of 8 students answered the survey, but since it was anonymous, it is not known if these were the same 5 students who participated in the interview. The focus of this analysis is to evaluate student engagement and, where relevant, course organization and course content are factored in.

Student engagement from student self-evaluation survey

1. I really want to learn this material (Thoughts/emotions)
   Result: 40% Yes, mostly agree; 60% Yes, agree completely.
2. I put time and effort into my studies (Skills)
   Result: 20% Perhaps, agree partly; 40% Yes, mostly agree; 40% Yes, agree completely.
3. I participate actively with questions and comments (Participation).
   Result: 100% Yes, mostly agree.
4. Good grades are not important to me. (Performance, reversed)
   Result: 20% No, not agree at all; 60% Perhaps, agree partly; 20% Yes, Mostly agree.
5. I look forward to class (Thoughts/emotions)
   Result: 40% Perhaps, partly agree; 20% Yes, mostly agree; 40% Yes, agree completely.
6. I seldom read all course literature (Skills, reversed)
   Result: 40% No, don't agree at all; 60% Perhaps, agree partly.
7. I give the other students constructive feedback and helpful comments (Participation)
   Result: 80% Yes, mostly agree; 20% Yes, agree completely.
8. Good performance in presentations and assignments are important to me (Performance)
   Result: 100% Yes, mostly agree

The students' *thoughts and emotions* show that they were eager, or very eager, to learn the material according to the survey. They were not, however, looking forward to class to the same extent, possibly because the lectures also came with assignments and presentation. The survey shows that the students, for the most part, enjoyed each other's presentation, but also felt pressure to perform well in front of the others. The desire to perform well can be read as a high level but considering the lesser degree of "looking forward to class", the assignments must also be understood as pressuring, and possibly also stressing, the students. Emotional engagement means engaging with the course content and feeling that it is relevant and has meaning in the student's life (Handelsman et al., 2005). The high levels of engagement indicate that the students could relate to what was taught in class and use it. One student wrote that the practice-based multisensory exercises were clarifying, and that they "helped me to better understand why I feel what I feel". Another student noted that they felt "happy and inspired by the unusual exercises". Both answers express positive feelings towards the use of sensory activation, and the word "unusual" specifically points to variation, as in other than the expected course design. The exercises also help students to apply in practice what they learn in theory, thus realizing what the theoretical knowledge means in real life and stimulate emotional engagement. Teaching presence in a course depends on organization and communication, both teacher-student and between students

(Garrison, 2017). The *course structure* with recurrent presentations where students talk about their sensory analysis of an art object, enabled students to share sensory observations, give feedback on each other's analysis and learn from other students' experiences. The dialogue and feedback from teacher and other students helped build teaching presence when *facilitating discourse*, and *open communication* to benefit social presence.

Student self-evaluation of *skills* in the survey indicates that they put time and effort into their studies to a high or very high degree. This is partly confirmed when it comes to reading the course literature, where 40% not agree at all to the statement that they would not read all literature. 60% of the students admits "perhaps, agrees partly" to this, but nobody is prepared to answer that they don't read all the literature as a rule. Skills engagement is linked to the desire to learn (Handelsman et al., 2005), and the fact that students perceive that they invest both time and effort in the course is consistent with their expressed desire to learn. The more time and effort they put in, the higher the level of engagement – and vice versa (Purinton & Burke, 2020). This means that regular activities that keep students busy and engage them with the course content in meaningful ways help build engagement. In this course, the weekly sensory exercises were designed to involve both theoretical knowledge and practice based application, and the assignments were examined in a step-by-step process, (oral and written) including feedback in every step. One student notes in the survey that they appreciate the rhythm with regular written assignments, another finds the structure with short oral presentations, followed by feedback and then a written assignment helpful. The unusual course design required strong teaching presence as in clear instructions (written and oral) from the teacher, and feedback (oral) during the seminars from teacher and fellow students.

The survey shows unambiguous results concerning *participation*. 100% of the students mostly agree to participating actively with questions and comments. They also mostly (80%) or completely (20%) agree to giving constructive feedback and helpful comments to fellow students. This high level of active participation is consistent with the desire to learn but also with the course design where exercises and presentations demand a high level of student activity. Participation engagement concerns participation in class, but also interactions with teacher and other students (Handelsman et al., 2005). The results show that the course design with regular presentations and mandatory participation in class, as well as mandatory interaction with other students (feedback) build participation engagement. There is a risk, however, that mandatory participation also create stress and that students potentially feel uncomfortable presenting oral assignments on a regular basis. This is not shown in the results, but the fact that only 5 of 8 students answered the survey might indicate that not all students were as enthusiastic. As shown by Garrison, Cleveland-Innes and Fung (2010) teaching presence has a strong influence on social presence. Consequently, both the structure of the assignments, and the communication climate in class are very important to create a learning environment where student wish to participate actively and communicate freely.

The results concerning *performance* are somewhat contradictive, since the students clearly desire to perform well in class, during presentations and assignments and exams, but are less interested in good grades. The grades are not that important, performing well is. If students' desire to learn is factored in, the results are easier to understand. Many of the students are mid-career, or retired, meaning that the desire to learn is more important than the grades. That said, the wish to perform well often leads to good grades. This also shows in the above result for emotions: students were eager to learn, and this propelled their desire to perform well. Performance engagement is linked to the desire to perform well in class, and to get good grades (Dixson, 2010). These two aspects of performance engagement are not necessarily similar, as indicated in the survey results. With a strong emotional engagement, students see the value of the course content and the desire to learn might overshadow the desire to get good grades, but on the other hand drives the desire to perform well in class. The latter is also linked to social presence, where *open communication* (a climate where students feel free to share) and *group cohesion* (a sense of collaborative belonging) is fostered by regular communication (Swan, 2021). A high level of performance engagement in the sense *desire to perform well in class* often subsequently

leads to good grades, even if the latter not is the students' primary focus. The multisensory learning activities served to stimulate active participation and communication and could in this regard also be said to build performance engagement.

Course organization and course content

The survey shows that the students appreciate the course organization, given its format: distance education at a 50% rate. Information before and during the course, the online student platform and the course guide all got high scores in the survey. That said, the open-ended questions added a critical view to this. The majority of the students (80%) found the student-centered course design with presentations of examples of the student's own choice to be the strength of the course. One student, however (20%) expressed an opposing view and found the student presentations too "self-centered". Within the CoI framework, teaching presence depends on factors such as *course design and organization*, *facilitating discourse*, and *direct instructions* (Swan, 2021). This means that a clear structure in overall course design as well as in specific activities, one that students can understand and easily adapt to, is imperative. If students don't understand what to do, and how to do it, the meanings of the learning activities are lost. The results of the survey show that the course organization was perceived as understandable and the instructions clear, but that the framework (schedule, course guide) might have been available at an earlier date, underlining the need not only for clear instructions, but also enough time to prepare and adapt to the given structure. Course organization in this online course also indirectly affect emotional- and participation engagement (Dixson, 2015) understood as for example enjoying online interactions (zoom, chats) with teacher and other students, and the desire to participate actively (asking questions, commenting in the chat, giving feedback to other students in zoom and on the online platform). Strong teaching presence (structure and clear instructions) facilitate active participation and builds engagement.

Summary of the online survey

Results from the online survey indicate a high level of student engagement when it comes to participation and desire to perform well in class. Most of the student also really enjoyed the oral presentations and the student-oriented course design, whereas someone did not and would have preferred more lectures and less seminar discussions. The multisensory exercises were discussed in open-ended questions and the students were positive and appreciated the practical application of theoretical concepts in the exercises. Comments about the exercises were "well-functioning", "The exercises worked well, they made me better understand why I feel what I feel and gave me a language to express it", "easier to understand with practice", "appreciate active participation". The survey results point to the dynamic nature of student engagement, and the interdependence of all four aspects of engagement, as discussed by for example Coates (2007), Dixson (2010) and Vezne et al. (2023). Clarity and communication seem to be the foundations for a strong web of engagement, and as Dixson (2010) points out, collaborative work between students build engagement. In this course, the activities and the sharing of results with feedback in collaborative discussions served to create a sense of community and engagement on a collective level. Viewed as a community of inquiry, the relationships between all three presences can be seen in the survey results, all three important to create a working CoI environment (Garrison, 2017). Summarizing the survey results, the multisensory learning activities required a strong teaching presence in order to work, and this also led to an increased social presence through the recurring dialogue and communication between students, and between students and teacher (questions, comments and feedback). The cognitive presence in the course was supported by the other two presences, through the 4-step process (*triggering event, exploration*, *integration*, and *resolution*, described by Garrison (2017). The multisensory exercises represented triggering events and arose curiosity. Carrying out these assignments with a sensory focus represented the exploration step, where students explored different ways to apply the theoretical knowledge in practice. Integration, the step where the experience is conceptualized and reflected upon is represented by the written assignments where the analysis was theorized and discussed in relation to course literature. Integration, finally, where the problem is explained and solved, was completed in the peer-review process where feedback from other students and teacher completed the learning process.

Group interview

The group interview was performed as a semi-structured discussion, led by the teacher, with 5 participating students. The interview took place after the final exam, and the participating students were aware of the interview being a part of the evaluation of the course for research purposes. They were all willing to participate and share their thoughts and feelings about the course in general, and the multisensory learning activities in particular. The transcribed and anonymized interview was thematized according to the same categories as the online survey.

Student engagement from a student perspective

The students' expressed *thoughts and emotions* about the course experience in different ways, mostly using words such as fun, enjoyable, interesting, happy with, rewarding. The negative emotions associated to the course experience were expressed as hard, stressful, missing out (on social contact) and difficult. The overall impression of the interview was that the course was appreciated, and that students were excited about the new material. They talked about "a new way of thinking". Some of the students perceived presenting in class as a stressful moment, because of the pressure to come up with relevant and interesting material. Emotional engagement, as in personal relevance and emotional involvement with course content (Handelsman et al., 2005), was expressed as enjoyable, interesting, and rewarding. The negative feelings (hard, stressful, and difficult) all connects to the assignments, and the pressure to perform in class. The negative feelings are also an aspect of engagement, since it shows that the students care about the results, and desire to perform well – even if they find it hard, at times. Emotional engagement could be related to the overarching idea of the CoI framework, that meaningful production of knowledge is a collaborative and ongoing process (Garrison, 2017; Garrison et al., 2000, 2010). The feelings of stress in relation to performing well in class, and the positive feelings of finding the work rewarding, can both be connected to the collaborative course design, triggering a desire to partake in the group activities and belong to the community.

Skills they had to perform to follow the course were expressed as planning ahead to come up with good presentations, and spending time on thinking to understand new perspectives. The students also pointed to the skills they achieved from the course, such as "new ways of thinking", useful perspectives, and the ability to combine new theoretical concepts with earlier knowledge. Skills engagement, understood as engagement through practicing skills (Handelsman et al., 2005) is a double-faceted aspect of engagement. It *takes* engagement to engage in the necessary skills (reading up on literature before class, preparing presentations, studying regularly etc), but it is clear from the results that practicing these skills also *increases* engagement. Student comments in the interview pointed to the work required by the recurring multisensory exercises as both difficult and rewarding, particularly when the hard work resulted in new ways of thinking. The process could be understood in the light of the CoI teaching presence, the combination of organization and communication (Swan, 2021) that gives a clear framework and supports a climate of discussion and dialogue, for students to dare to present their proposed analyses in a new theoretical field to each other.

Active *participation* was stated as a prerequisite to understand the course materials. Nobody questioned this, and all active students in the course were *very* active – participating in class, presenting, commenting, and handing in assignments as well as peer-reviewing and commenting on each other's texts. (Apart from one drop-out student who only attended the introductory lecture, and then never showed up again.) The positive side was that this created a helpful community where it felt natural to comment and encourage each other. The negative side could be that this level of activity also put pressure on students and that receiving other students' helpful comments could be perceived as stressful. Participation engagement in online courses (Dixson, 2015) could entail participation in online lectures, (if the design is synchronous), posing questions, participating in chats, and posting comments in relevant forums. The result of active participation is often that the students build a stronger feeling of belonging to their group, or social presence from a CoI perspective, and enjoy working together. In this case, the mandatory weekly presentations created a framework that both *demanded* and *facilitated* active presence.

Student *performance* in the course was commented on in a less direct way than in the online survey. Nobody mentioned grades or final results, but they discussed the ambition to present interesting cases and how much they liked to listen to each other's presentations. Performance engagement, understood as the levels of performance in class (Handelsman et al., 2005), was expressed in the interview in terms of ambition to perform interesting presentations, potentially increasing the peer-pressure to perform well. In terms of cognitive presence, understood as a student's ability to create knowledge individually and together (Garrison et al., 2000, 2010), the collaborative aspect of presenting and discussing the exercises in class point to the beneficial potential of the course design.

Course organization and course content

Student comments about the *course organization* were mostly positive, given the prerequisites of the course. They all appreciated the 50% study pace, apart from one student who would have preferred 25% pace due to working fulltime. The students were less enthusiastic about the zoom-format, and all expressed, in different ways, that they would have preferred to meet in person, at least once or twice during the course. Critical comments about the distance format mostly had to do with the lack of contact and missing out on the social side of studying. When discussing the *course content*, all students agreed about how positive they were about the course. New methods, broader perspectives, and interesting cases, as well as the usefulness of the new theoretical concepts were pointed out. Weighted against the results from the anonymous survey, this result still stands, but could be balanced by negative feelings of stress about finding new and relevant examples to present, and pressure to understand and internalize new ways of thinking. The consensus seems to be that the course experience was interesting and rewarding, but also stressful and hard at times. Teaching presence online, consisting of *design & organization, facilitating discourse* and *direct instructions* (Swan, 2021) means the teacher's responsibility to provide the framework, and facilitate communication in multiple ways. During the course, however, the students also take on the responsibility for teaching presence, when commenting and giving each other constructive feedback and encouragement. In this course, the teaching presence was created as a joint work by teacher and students, in a common desire to make this course work, and overcome the pitfalls of distance education, such as the feelings of missing out on social contact, and lack of informal smalltalk during breaks expressed by students during the interview. This common desire to create a collaborative group climate could be understood in terms of a combination of participation and emotional engagement.

Summary of the group interview

A clear result from the interview was that the students were excited about the new concepts and ways of thinking, such as applying the new multisensory theoretical perspectives to artworks and discover new meanings, or systematically paying attention to embodied reaction and being able to verbalize them. They appreciated the course structure with regular exercises, presentations, and hand-ins. This structure, however, also created pressure and was, at times, perceived as hard, possibly also stressful for some of the students. The *sharing* part of the course (listening to each other's presentations, peer-reviewing each other's texts) also helped build social contact and counteracted the lack of physical meetings. In summary, the students talked more about the positive experiences of the course than the negative. A conclusion could be that it was interesting but also difficult, but in the end worth the hard work. This conclusion might be an obvious one, considering that the group who participated in the interview were all active students who had handed in all assignments and exams. The results could be understood considering the complexity of all aspects of engagement, each of them important, and working together to create genuine student engagement. In this case, skills engagement was a prerequisite to complete the course assignments, creating pressure and possibly stress, but subsequently perceived as rewarding. Participation engagement was demanded as well as facilitated by the course design, also possibly creating mixed feelings of pressure and fulfillment. Emotional engagement was built when the students internalized and understood the new course content, applied in the assignments, but also through communication and group discussions. Performance engagement was built through the desire (and peer-pressure) to perform well. To conclude, the importance and complexity of student engagement was expressed in multiple ways during the interview.

Field notes

The process diary was written from the teacher's perspective, noting student activity, questions, comments, level of presentation and engagement. This data was thematized using the same categories as the survey and the interview. Skills, participation, and performance were possible to measure using these notes. From the teacher perspective, individual thoughts and emotions were not measurable on an individual level, but a general assessment of mood, engagement and enthusiasm could be made.

Student engagement from a teacher perspective

Notes on *thoughts and emotions*: The overall assessment of the mood and emotional climate in class was one of helpfulness, encouragement, and relaxed attitudes. All students were comfortable to partake in zoom class with their cameras turned on and comments were made about the importance of seeing each other's faces to create a more personalized interaction. This feeling of relaxed comradeship seemed to increase during the course. To achieve social presence online, Swan (2021) points to three important factors*: affective expression, open communication,* and *group cohesion*. In sum, the students must feel at ease communicating, be able to express themselves according to their values, and feel that they are part of the group. The notes in the process diary indicate that such a climate developed during the course, and that the students felt increasingly at ease together. The sensory activation in the exercises triggered new ways of thinking about objects and phenomena they already (thought they) knew, and this change of mindset might have contributed to the open climate of discussion. All students, regardless of previous experiences, faced something new and perhaps challenging, and they were eager to share their experiences. In terms of emotional engagement, the involvement with the course materials through hands-on experience in the exercises helped clarify the usefulness of the new theoretical framework and demonstrate how it could be used in practice.

Notes from the process diary about *skills* are concerned with content (the students' capacity to find interesting case studies, reading the literature, and application of concepts and relevance to the course) and with presentation technique and commenting. The notes indicate that students took the assignments seriously and put in effort to examine art objects in real life, for example to visit a building to study the sensory and materiality aspects of architecture. All students had interesting things to say, and presented cases with a high level of advanced analysis. The ability to read course literature was apparent during presentations, and the general assessment was that students read, albeit not always every text, but that they managed to understand, and apply, the essence of each course theme. Skills engagement online demands not only engagement through expected study skills, but also skills connected to the online environment (Dixson, 2015). This means a certain level of technical knowledge, such as and basic zoom-skills, as well as feeling comfortable online. Observations in the process diary show that the student group quickly mastered these skills and could concentrate on other skills, such as applying the theory in the multisensory assignments. The increasingly advanced level of discussion observed suggest that cognitive presence was developed during the course, and that the student group on a collective level managed to go through the entire four-step process (Swan, 2021).

Consulting the process diary, the students' active *participation* was obvious. The students participated in class and made their presentations, commented frequently, using the chat during presentations and during seminars. Most students also posted links, images, literature tips, and generally helpful comments in the chat. This behavior created an informal discussion that helped build social contact, and subsequently, a sense of group community. The informal discussion climate developed in class, and often expressed in a parallel ongoing discussion in the chat, could be understood in terms of participation engagement, perhaps most clearly using its older name *participation/interaction engagement* (Handelsman et al., 2005). The student group clearly valued communication in multiple ways, and the online format also invited the less extrovert students to partake in the discussion, using the chat. The social climate that developed during the run of the course could also be explained in terms of social presence, from a CoI point of view, with an increasingly open and relaxed communication, building collaborative group cohesion.

A high level of student *performance* was maintained during the course. The assignments, both written and orally presented, were interesting and well thought out. The process diary speaks of good performance and engaged students. Less visible in the notes are the amount of stress or anxiety that might have preceded the achievements – the process diary speaks of what was noticeable in class, and the overall analysis must acknowledge that students might prefer to not complain in class. The written assignments confirm the level of performance and confirm that students in this course desired to learn. Through the lens of performance engagement, the student group clearly desired to perform well and possibly triggered each other in the learning process. The oral presentations simultaneously acted as carrot and stick, and as a group, they encouraged each other. From a CoI perspective, this could be vied as a combination of social and teaching presence at play, and in this case the collective student group also took on the responsibility for maintaining both presences during the entire course.

Summary of the process diary

The aspects of student engagement summarized from the process diary show that the students demonstrated high levels of engagement and were willing to invest time and effort in their studies. They seemed to enjoy the challenge, but the backside of this (stress, anxiety) was not visible during the zoom lectures. Compared to the group interview, where the participating students spoke freely of the stress and of finding the assignments difficult at times, the process diary was more concerned with actions and could not sufficiently register feelings of individual students. The complexity of student engagement stood out on a collective level from the process diary, where aspects of all types of engagement could be detected, albeit with a focus on participation, skills and performance. Emotional engagement could be read through the positive communication climate and general helpfulness in the group, but harder to assess on an individual level. From a COI point of view, the observations show how all presences increased during the course, and how they played different roles during the process: social presence a bit hesitant at first, but with a strong development during the run of the course. Teaching presence proved important throughout the course, initially the teacher's responsibility, but with the student group taking an increasing amount of responsibility. The cognitive presence increased during the course, propelled by the other presences, and driven by the collective dialogue in class.

Results

The thematic analysis of the online survey, group interview and process diary show that the students were positive to the course content and the structure, and that they appreciated the rhythm of the course (regular exercises, presentations, and hand-ins) albeit perceived the pressure sometimes as stressful, and the new content at times hard and time-consuming to grasp. The distance-format was a challenge – all students talked about the importance of social interaction, eye-contact, and a feeling of belonging to a group. They would have preferred physical meetings, but at the same time acknowledged the possibilities to accept students from different locations as an advantage. It was also clear that students' strategies to participate actively and share thoughts and comments helped create a sense of community, and counter the negative effects of distance teaching.

Emotions and participation

The students acknowledged the importance of seeing fellow students faces to create a sense of togetherness in class. They worked actively with the chat-function, commenting, posting useful links and images to create a relaxed atmosphere of communication. The personalization of the zoom experience could somewhat counter the feeling of loneliness at a distance, and the chat function was used as a stand in for the lack of face-to-face small talk during breaks. Active participation, both on an individual level and on a group level, was perceived as crucial to the feeling of belonging in class and the creating of a community. Because of the distance format of the course, students had to work harder to create a student community. Emotional and participation engagement formed a strong base to maintain both social and teaching presence during the course. Active participation and a helpful approach helped achieve this goal.

Skills and performance

The exercises and the written assignments were perceived as useful training tools to try new methods and perspectives in real life, and not only read about them in texts. The bodily activation completed the zoom lectures and helped create a balance between theoretical *learning* and physically *doing*. The embodied experience created also helped anchor the conceptual course content. Oral presentations activated the students and the recurrent sharing of experiences served to sharpen individual descriptions through immediate feedback in class. The *sharing* part also helped broaden the experience base of the class, both as content (*what* was presented) and as exercises (*how* was it presented). The presentations, together with the feeling of *belonging to a community* discussed above, also triggered a higher level of performance. Skills and performance engagement proved important to propel the ambition to perform well and contribute to the group experience. Students wished to perform well and to present interesting and well thought out cases in class to contribute to the collective learning experience of the group.

The conclusion of the thematic analysis is that all four aspects of engagement are linked together, and interdependent. A feeling of belonging and purpose in class is dependent on active participation. Skills and performance depend on each other and are enhanced by belonging and activation. The course results depend on course design and course content, but the results show that a crucial factor is to also acknowledge the importance of creating a student environment that encourages active students, and to help students create a feeling of purpose and belonging in the group. Student engagement counter isolation in the distance course format. Expressed from a COI perspective, the causal relationships between the three presences is validated in the results. Teaching presence affect social presence, and both are necessary to develop cognitive presence. Student engagement, and a community of inquiry can develop if all aspects are maintained in course structure as well as communication.

Course outcomes: analysis of assignments and final exam

The course results were measured using constructive alignment, where the individual assignments and exams were evaluated in relation to the learning outcomes of the course. The assignments consisted of weekly oral presentations, followed by weekly individual reports where the presentations were furter problematized in relation to relevant theoretical perspectives. The final exam consisted of a similar procedure, where the written exams also were presented during an oral examination. The assignments were graded and evaluated by the teacher in relation to the learning outcomes, and the overall results on a group level were compared to similar exams in courses with a more traditional approach.

Knowledge and understanding

The learning outcome to “show in-depth understanding of the contemporary art field, from a multisensory perspective, and how sensory knowledge may have an impact on, for example, the art-, design-, architecture- and performing arts fields” was achieved in multiple ways. Weekly assignments where students *performed fieldwork* and *examined art objects* in real life, *with all senses*, and then *presented* and *theorized* their experiences in class constituted the foundation of the learning activities. The oral presentations and subsequent discussions served as learning spaces, where different examples and analytical problems were discussed. Field work, presentation, analytical discussion and text production helped develop the skills with formative feedback (given and received) as a part of the learning process. To “show insights in current research concerning multisensory aspects of art and culture” was practiced and achieved in the written assignments, where problematization and analysis from the oral presentations were expanded and anchored in the course literature and current research. The final exams demonstrated that the students had achieved both knowledge and understanding of the field during course, and that they were able to discuss and problematize relevant questions in the field. Biggs and Tang (2011) specify that knowledge must be actively used, rather than passively delivered.

The first learning outcomes focus on the verb *show*, as in demonstrate, and the assignments served as a framework for sensory activation and practice-based application of theoretical knowledge. The step-by-step process from fieldwork and observation to application and theoretical integration led to an active use, and better understanding of the theoretical course content. The students were able to *show* the in-depth understanding, and insight stipulated as intended course outcome.

Competence and skills

The students practiced to "independently identify, formulate, and critically process relevant problems in contemporary multisensory art and artistic processes" through the exercises, and demonstrated these abilities during the oral presentations, and in the individual written assignments. The same was valid for the ability to "analyze empirical materials, using relevant methods". They learned to "critically and constructively peer review and discuss both their own, and fellow students' work" through the peer-review process where students systematically read and commented on each other's written text. The process of reading and commenting on other students work also helped to critically assess their own text production, along with the comments they received. All learning outcomes were clearly visible in the written exams, where the recurrent peer-review process helped students to problematize and discuss relevant questions, as well as sharpen their analytical process. New concepts and methods with a focus on sensory activation were applied. This meant new methodological approaches aiming to actively use all senses in analysis, and to theorize embodied reactions in relation to the experience of art. The students were able to demonstrate in-depth understanding of the field in the final exam. Biggs and Tang (2011) highlight the importance of engaging in an activity to fully internalize new knowledge. These intended outcomes specify that students should *identify, formulate, critically process,* and to *peer-review and discuss* course content. In the weekly assignments, students were tasked with the choosing of relevant art objects to analyze, and to formulate relevant research questions from a multisensory perspective. These were processed, demonstrated, and discussed during the oral presentations, and the weekly peer-feedback from another student on the written assignments also actively trained them to give and receive feedback.

Judgement and approach

The learning outcome to "systematically problematize and critically engage with complex questions concerning multisensory aspects of contemporary art and culture" was practiced throughout the course, in lectures, exercises, reading assignments and critical discussions. The outcome was visible in the exams, particularly in the qualified choices of problems to engage with, and the complex analytical discussions that followed. An example of the critical engagement could be the application of new multisensory theory on a previously well-known artwork, usually discussed in terms of visual analysis only. The results would be that students discovered new sensory aspects, leading to a deeper understanding of the artwork, and a subsequent problematization of traditional methods of analysis. To "balance different voices within the field against each other, and independently assess empirical materials within the framework of the course" was achieved in the recurrent seminar discussions where the multitude of examples and perspectives served to pit different research positions and perspectives against each other in constructive ways. The ability to combine or oppose different writers' opinions to create a dynamic analysis was applied in the exams. As pointed out by Biggs and Tang (2011), the intended learning outcomes aim to impact student perception on a more fundamental level than only to produce new knowledge. To actively engage in learning activities and to apply the course content in practice, helps to internalize knowledge and might lead to a change of judgement and approach. These intended course outcomes focus on student abilities to *problematize, critically engage with* complex questions, and *balance* different voices, as well as *assess* empirical material. The exercises where students critically engaged with the new course content in relation to their pervious understanding led to new ways of seeing and engaging with art, and in a broader sense, culture.

Results

The overall impression of the course results was that students recognized having achieved a new "toolbox", expanding their descriptive competence together with new theoretical concepts for understanding multisensory aspects of art. They also found that they had changed their way of thinking about artistic encounters and art, embracing a broader sensory palette. This new view also included the understanding of former art encounters: several examples of gaining new understanding of old experiences were presented. An unexpected result was the enthusiasm with which the students embraced the multisensory exercises, and the degree of sensory input they were able to detect and analyze when researching art objects *in situ.* To summarize, Biggs and Tang (2011) advocate a view where education ideally leads to changed perception, rather than knowledge only. They point to the crucial role of active teaching methods in outcome-based education, and how active learning strategies hold potential to overcome differences in student engagement. The addition of multisensory hands-on exercises in the course created a framework where fieldwork in real life, and discussions with other students online were necessary. This increased student activity, and the application of theoretical knowledge in practice. Comparing the course results on a general level with the expected outcome of similar courses with a more traditional, visually centered approach, what stands out is that the *broader* multisensory approach also leads to a *deeper understanding* of the artwork. Another reflection is that the *descriptive competences* gained in the course when describing and analyzing all sensory input, also *benefit the visual descriptions* and the written assignments in general. Body and mind seem to join forces and the activation of sensory precision also potentially sharpen linguistic acuity and eloquence.

Discussion and conclusions

Multisensory activation and student engagement

The findings point to the beneficial effect of a multisensory approach in different ways. The increasing research interest in multisensory aspects of art, culture and media during the last decades is also known as the *sensory turn* (Classen, 2017; Heywood, 2017; Howes, 2006, 2022). The perspective is also present in research concerning higher education, where a multisensory approach to teaching and learning is discussed in terms of an active and diverse learning environment (Kress, 2010; Kress & Van Leeuwen, 2020; Purinton & Burke, 2020; Sinclair, 2018). The overall results of the study confirm that multisensory activation can be an effective means to activate students, in real life as well as online. The findings are supported in the literature, where activity, variation, and interaction are proposed as means to engage students and create meaningful learning experiences (Arthurs & Kreager, 2017; Biggs & Tang, 2011; Dixson, 2010, 2015; Garrison, 2017; Garrison et al., 2000, 2010).

Communication and dialogue seem to be a key to process the impressions and transform experiences into meaningful knowledge. The study shows that students value the dialogue and social interaction online, and that they actively interacted both orally and in written comments to share their sensory experiences, and to create an ongoing discussion despite the online format. Several studies also indicate that an active use of the senses will increase perceived presence, and that discussing the experiences in the group will contribute to engagement and collective learning (Cesari, 2021; Heinrichs, 2021; Newman, 2019; Rose & Hedrick, 2018).

An unexpected positive result was that the students were so very enthusiastic about the multisensory exercises, and that they, unprompted, started to talk about gaining a new way of viewing their field during the course. This aligns well with Biggs and Tang (2011), who propose that education ideally should lead to changed perception, rather than knowledge only. The results also show that the students appreciated a framework of regular exercises, presentations, and hand-ins, but sometimes found the pressure to be stressful, and the new theories and concepts difficult and time-consuming to understand.

This underlines the possible negative side-effects of engagement, a much less discussed field in the literature and where further research would add valuable insight.

The overall impression of the course results from an art history perspective, was that students recognized having internalized the new theoretical concepts for understanding multisensory aspects of art and that they, in the process, had changed their way of thinking about art, and art history. The high degree of sensory input the students were able to detect and analyze when researching art objects on site was somewhat surprising and strongly encourage the use of a multisensory approach in art history education. A conclusion is that the broader multisensory approach also leads to a deeper understanding of the artwork, and that the descriptive competences gained in the course when analyzing sensory input, also benefit the visual descriptions and the written assignments in general. These findings are supported in the literature, stating that multisensory aspects of art need to be discussed, theoretically framed, and applied through practice in art history education (Bacci & Melcher, 2013; Di Bello & Koureas, 2010; Hunter-Crawley & O'Brien, 2019).

Activation in online education

The online format was perceived as an obstacle. The students would have preferred physical meetings and acknowledged the importance of social interaction and eye-contact. On the other hand, active participation, and discussions in class about thoughts and emotions helped create a sense of community and counter the negative effects. The findings are consistent with the literature, where student activation is discussed as even more important in online education, to counter risks of perceived isolation and detachment (Capone & Lepore, 2022). Student activation increase engagement and counter isolation in the distance course format.

The pandemic triggered an increasing interest in online education and the research field of online student engagement is still developing (Martin et al., 2022; Vezne et al., 2023). Existing research indicate that activation and variation have strong impact on social presence and learning communities online (Cleveland-Innes & Garrison, 2021). The importance of activities to increase engagement and create an inclusive and welcoming climate for discussion in the group was corroborated in the study. The recurrent discussions, live online, and as written comments and peer-reviews, created an ongoing dialogue that included all students, regardless of location. As suggested by Marshalsey (2023), abstract and conceptual education benefit from sensory exercises and embodied experience to create deeper levels of cognition by connecting mind and body. This could also be said about online education, where physical distance from teacher and other students risk to create detachment.

Strengths and weaknesses of the methodological approach

The OSE-scale was effective to measure student self-evaluation and their perceived desire to learn, but the results from the survey were not enough to evaluate the effectiveness of the exercises in relation to the course results. Adding the OSE-questions to the regular survey aligns with the aim to interfere as little as possible with the normal course procedures, thus refraining from an extra survey. The advantages were that students could be expected to fill in the expected survey, but perhaps not an extra survey. The disadvantages were that the OSE- questions had to be reduced to 8 to fit into the regular survey format. The quantitative results of these questions were indicative, but not enough to make a comprehensive analysis of student engagement. Viewed in relation to the qualitative results from the interview and notations from the process diary, student behaviour and performance were possible to evaluate together with course results.

The different vehicles of data collection also gave different focuses in the analysis. During the group interview, the participating students spoke freely of the stress and of finding the exercises difficult, whereas the process diary noticed actions and achievements, but was less able to register emotions of individual students. The evaluation of course outcomes using constructive alignment proved a valuable addition to the data, with a more outcome-based focus. In sum, the combination of methods and perspectives in the study helped illuminate the complex web of actions and emotions that make up student engagement and how they affect the perceived presences of a community of inquiry. The quantitative structure of the OSE-scale structured the study and gave it a skeleton, and the qualitative approaches added flesh to the bones. This means that the findings show that the OSE scale makes a functioning structure for research on student engagement, but that the quantitative evaluation potential of the scale is better suited for large surveys, with more questions and a larger group of respondents. A mixed methods approach (Daniel & Harland, 2017; Tight, 2019) is particularly important when the population is small. With only 5+5 students participating in the survey and the interview, the results had to be evaluated using a combination of methods and perspectives.

Conclusions

- *In what ways does the integration of multisensory learning activities in an online course impact students' perceived levels of engagement?*

The findings show that multisensory activation has impact on student engagement in multiple ways and that all four aspects of engagement are connected and affect each other. Multisensory activities affect *skills engagement* through practicing skills. In the course, the exercises helped to apply new theoretical knowledge in practice. The multisensory focus meant that students had to employ new ways of thinking and push themselves to think, and act differently when paying attention to all senses and embodied experiences in relation to objects they would normally just look at. This, in turn, made it necessary to maintain a high level of skills engagement in relation to study skills such as reading the literature, paying attention in class, an preparing their assignments. Activities that push students to think in new ways to apply theoretical knowledge in practice and engage them with the course content in meaningful ways serve to build skills engagement. Sensory activation adds a level of complexity to this process. Multisensory activation has impact on *emotional engagement* when enabling students to engage with the course content to understand its relevance and usefulness. Active involvement with the course materials through hands-on experience in exercises help clarify the usefulness of new theoretical knowledge, demonstrate its relevance, and increase emotional engagement. Sensory activation broadens the theoretical understanding with embodied experiences and connects mind and body. Negative emotions, however, are also an aspect of engagement, and too much engagement might create stress. *Participation engagement* is influenced by multisensory activities through increased participation and communication. Presentations, shared experiences, discussions, and feedback build participation engagement. Sensory activation adds to this process by inviting students to experience in new ways using their senses and explore a new descriptive language to share these experiences. Multisensory activation affects *performance engagement* when active participation and communication is stimulated, and the students desire to perform well in class. Sensory activation stimulates students to explore knowledge in new ways, building curiosity and the desire to perform well in class. The findings support the importance of activation online, to bridge distance and lack of face-to-face interaction. When all senses are used actively in a variation of course activities, new ways of thinking and communicating are stimulated. The results show that verbalizing and sharing experiences are important factors to clarify and theorize new experiences and transform them into meaningful learning. In the multisensory exercises, this is achieved during the process of exploration, presentation, discussion, and feedback.

- *In what ways does the integration of multisensory learning activities in an online course affect aspects of presence?*

Multisensory learning activities benefit the development of a Community of Inquiry in a variety of ways, all important for the building of a collective learning environment. The causal relationships between the three presences are prominent in the results. Teaching presence affect social presence, and both the former are necessary to develop cognitive presence. A community of inquiry can develop if all aspects are maintained in course structure, as well as communication. All learning activities that stimulate an open climate for dialogue (open communication) and a feeling of collaborative belonging (group cohesion) are beneficial in this regard. Sensory activation, when used in addition to the regular curriculum, provides students with a new toolbox for inquiry, activates new ways of sensory understanding and trigger new ways to discuss exercises and experiences. Fundamentally about variation, sensory activation enables students to use their senses and consequently, to think and feel in new ways. The foundation of the CoI framework is that meaningful production of knowledge is a collaborative and ongoing process. Sensory activation leads to new ways of understanding, and an exploratory process that aligns well with a collaborative learning climate of curiosity, exploration, integration, and resolution.

- *In what ways do the findings support and/or contradict multisensory activation as means to increase student engagement in online education?*

In relation to higher education in general, the results confirm what seems to be an agreement in the literature: that activation in general, and sensory activation in particular can increase student engagement on campus and online. Sensory activation is an effective way to create social presence and emotional engagement online if the sensory experiences are shared and discussed on a regular basis in class. This is important in distance courses, to counter the risk of isolation and disengagement. The findings, however, also detect the possibility of negative side effects of engagement as an area that needs further research. In relation to art history education, the results show that the broader multisensory approach also leads to a deeper understanding of the artwork. The findings demonstrate that the descriptive competences gained in the course when describing and analyzing the sensory input, also benefit the visual descriptions and the analysis in general.

- *Concluding remarks*

The aim of this study was *to critically evaluate and analyze the integration of multisensory learning activities in online teaching from a student engagement perspective. Analyzing this case study in art history in relation to a framework of collaborative learning and perceived presence, the study endeavors to the understanding of sensory activation as means to increase student engagement in online teaching.* The results show that sensory activation does increase student engagement in multiple ways, and that including learning activities with a pronounced multisensory approach is effective also in online teaching, thus contributing to the wider research field with a case study from a previously under researched subject area. The risks, however, are that new and unexpected learning activities demand very clear instructions, teaching presence as in organization and communication about the how's and the why's, to be successful. Other risks are that the introduction of multisensory activities, perceived as new, or unusual, might increase stress, and that high levels of engagement encompass positive, as well as negative aspects. The results suggest that sensory activation does indeed increase student engagement but should be introduced in relation to relevant course content, and framed with a clear aim as to why the activities are part of the course. The same is also true for exercises or collaborative learning activities in general, but the benefit of multisensory activation is the stimulation of new ways of experiencing the world through the senses, and ultimately the stimulation of new ways of thinking. Paraphrasing Biggs and Tang (2011), theory is not meant to be understood, but to change the way we see the world. Sensory activation could be one way to start such a journey.

Further research

1) Even if the study confirmed that sensory activation can increase student engagement, it also detected that negative side effects of emotional engagement are less researched, and that the literature mostly focus on the positive impact of engagement. Consequently, further research on the risks and possible negative aspects of student engagement would add valuable insights to the field.

2) The short-term effects in one course in art history were analyzed in this study. A series of subsequent studies, following the same course during a longer period, with new student groups, would validate the results. A broader focus encompassing similar studies in other subject areas would contribute with better understanding of multisensory activation in online education in general.

3) Given the strengths and weaknesses of the methodological approach, a study with a larger student population, and a separate survey including all the OSE-scale questions would allow a more comprehensive statistical analysis of perceived online engagement. The evaluation of the methods still points to the value of a mixed methods approach, and the results indicate that also a larger quantitative survey would benefit from a qualitative addition.

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Appendices

Appendix 1: Intended course outcomes in the KV5016 Sensing Art Syllabus

Intended course outcomes KV5016 Sensing art

Knowledge and understanding
On successful completion of the course the student will be able to:

- show in-depth understanding of the contemporary art field, from a multisensory perspective, and how sensory knowledge may have an impact on, for example, the art-, design-, architecture- and performing arts fields.
- show insights in current research concerning multisensory aspects of art and culture.

Competence and skills
On successful completion of the course the student will be able to:

- independently identify, formulate, and critically process relevant problems in contemporary multisensory art and artistic processes.
- analyze empirical materials, using relevant methods.
- critically and constructively peer review and discuss both their own, and fellow students' work.

Judgement and approach
On successful completion of the course the student will be able to:

- systematically problematize and critically engage with complex questions concerning multisensory aspects of contemporary art and culture.
- balance different voices within the field against each other, and independently assess empirical materials within the course framework.

Appendix 2: Process diary, template for fieldnotes

Fieldnotes

Lecture: (Title, date, teacher)

Student questions/comments during lecture

1) Observation and description

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.....
.....

2) Reflection and analysis

.....
.....
.....

Student presentations

1) Observation and description

.....
.....
.....

2) Reflection and analysis

.....
.....
.....

Student interaction (questions/comments after other students' presentations)

1) Observation and description

.....
.....
.....

2) Reflection and analysis

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.....
.....

Content and level of reflection in written reports

1) Observation and description

.....
.....
.....

2) Reflection and analysis

.....
.....
.....

Appendix 3: Course evaluation survey

a) English translation of the introduction, and Q3+Q8 – the parts of the questionnaire designed for this study

English translation of the introduction

Dear students,

In this course, we work with new forms of teaching and learning, and integration of multisensory exercises. It is generally about the overall content, but also specifically about the exercises in each theme: exercises that involve not only thinking theoretically about multisensory experiences, but going out in real life, visiting art and culture on site, taking notes, and observing the sensory aspects of the experience - visual as well as other sensory aspects.

This pedagogical development also means that **the course evaluation** is an important part of the work, to capture the student perspective. This course evaluation survey is anonymous, and of course voluntary. The results will be used in my pedagogical research for evaluation of the course and of the work with multisensory exercises in online education.

If you participate in the survey, you agree that your anonymous responses will be included in this evaluation. I am very grateful for your participation in the course evaluation!

Best regards, Viveka

English translation of Q3: Open question about the multisensory exercises

How do you think the multisensory exercises worked as a practical application of the theoretical themes in the course? What have you gained from doing the exercises and taking part of the presentations?

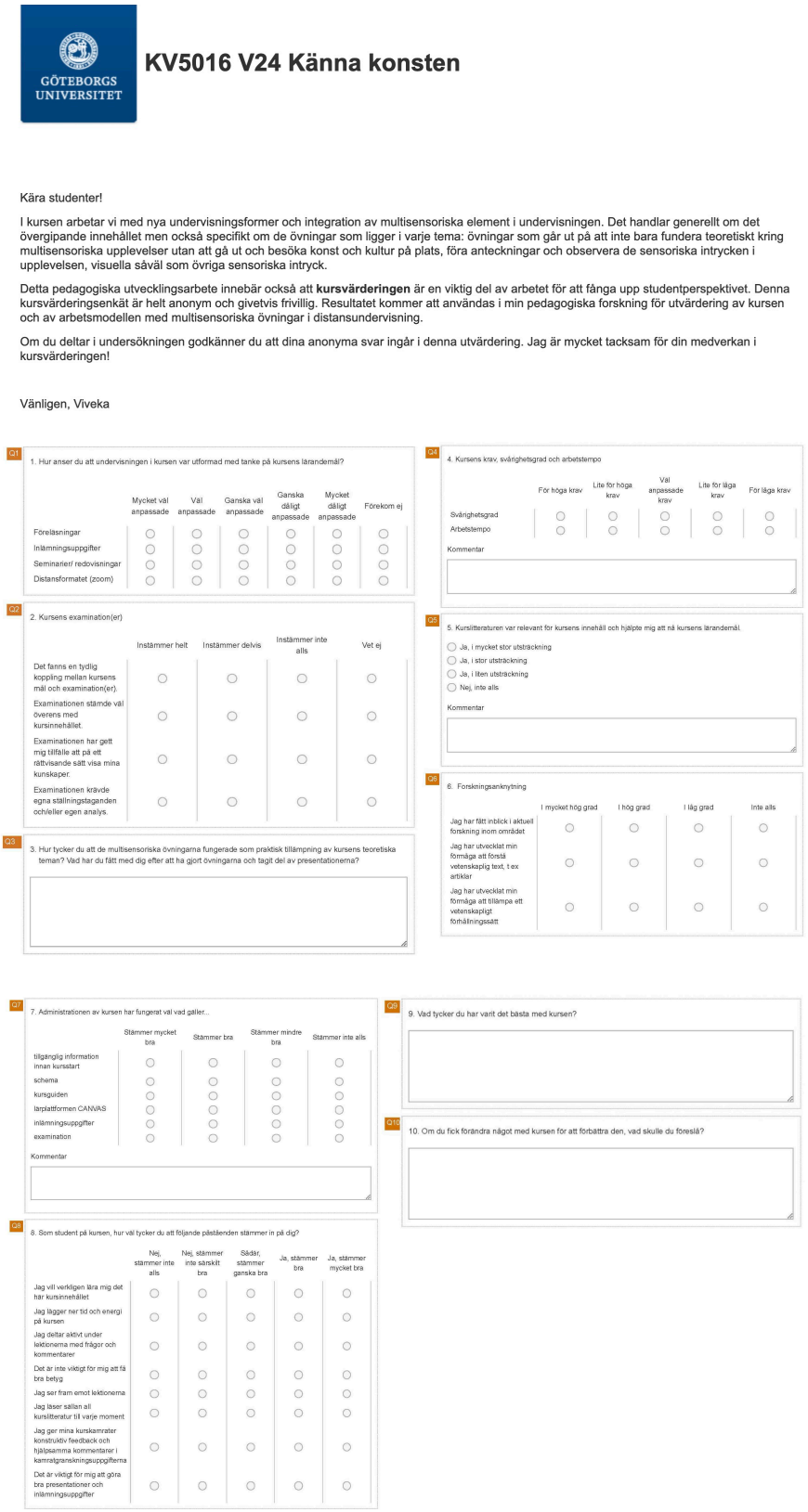
English translation of Q8: Questions from the Online Student Engagement (OSE) scale for student self-evaluation

- Q1+5 measure thoughts and emotional engagement
- Q2+6 measure skills engagement
- Q3+7 measure participation engagement
- Q4+8 measure performance engagement

5-step Likert scale (Yes, agree completely – Yes, mostly agree – Perhaps, agree partly – No, mostly don't agree – No, don't agree at all).

1. I really want to learn this material
2. I put time and effort into my studies
3. I participate actively with questions and comments
4. Good grades are not important to me.
5. I look forward to class
6. I seldom read all course literature
7. I give the other students constructive feedback and helpful comments
8. Good performance in presentations and assignments are important to me

b) the original survey in Swedish.



GÖTEBORGS UNIVERSITET

KV5016 V24 Känna konsten

Kära studenter!

I kursen arbetar vi med nya undervisningsformer och integration av multisensoriska element i undervisningen. Det handlar generellt om det övergripande innehållet men också specifikt om de övningar som ligger i varje tema: övningar som går ut på att inte bara fundera teoretiskt kring multisensoriska upplevelser utan att gå ut och besöka konst och kultur på plats, föra anteckningar och observera de sensoriska intrycken i upplevelsen, visuella såväl som övriga sensoriska intryck.

Detta pedagogiska utvecklingsarbete innebär också att **kursvärderingen** är en viktig del av arbetet för att fånga upp studentperspektivet. Denna kursvärderingsenkät är helt anonym och givetvis frivillig. Resultatet kommer att användas i min pedagogiska forskning för utvärdering av kursen och av arbetsmodellen med multisensoriska övningar i distansundervisning.

Om du deltar i undersökningen godkänner du att dina anonyma svar ingår i denna utvärdering. Jag är mycket tacksam för din medverkan i kursvärderingen!

Vänligen, Viveka

Q1 1. Hur anser du att undervisningen i kursen var utformad med tanke på kursens lärandemål?

	Mycket väl anpassade	Väl anpassade	Ganska väl anpassade	Ganska dåligt anpassade	Mycket dåligt anpassade	Förekom ej
Föreläsningar	○	○	○	○	○	○
Inlämningsuppgifter	○	○	○	○	○	○
Seminarier/ redovisningar	○	○	○	○	○	○
Distansformatet (zoom)	○	○	○	○	○	○

Q2 2. Kursens examination(er)

	Instämmer helt	Instämmer delvis	Instämmer inte alls	Vet ej
Det fanns en tydlig koppling mellan kursens mål och examination(er).	○	○	○	○
Examinationen stämde väl överens med kursinnehållet.	○	○	○	○
Examinationen har gett mig tillfälle att på ett rättvisande sätt visa mina kunskaper.	○	○	○	○
Examinationen krävde egna ställningstaganden och/eller egen analys.	○	○	○	○

Q3 3. Hur tycker du att de multisensoriska övningarna fungerade som praktisk tillämpning av kursens teoretiska teman? Vad har du fått med dig efter att ha gjort övningarna och tagit del av presentationerna?

Q4 4. Kursens krav, svårighetsgrad och arbetstempo

	För höga krav	Lite för höga krav	Väl anpassade krav	Lite för låga krav	För låga krav
Svårighetsgrad	○	○	○	○	○
Arbetstempo	○	○	○	○	○

Kommentar

Q5 5. Kurslitteraturen var relevant för kursens innehåll och hjälpte mig att nå kursens lärandemål.

- ○ Ja, i mycket stor utsträckning
- ○ Ja, i stor utsträckning
- ○ Ja, i liten utsträckning
- ○ Nej, inte alls

Kommentar

Q6 6. Forskningsanknytning

	I mycket hög grad	I hög grad	I låg grad	Inte alls
Jag har fått inblick i aktuell forskning inom området	○	○	○	○
Jag har utvecklat min förmåga att förstå vetenskaplig text, t ex artiklar	○	○	○	○
Jag har utvecklat min förmåga att tillämpa ett vetenskapligt förhållningssätt	○	○	○	○

Q7 7. Administrationen av kursen har fungerat väl vad gäller...

	Stämmer mycket bra	Stämmer bra	Stämmer mindre bra	Stämmer inte alls
tillgänglig information innan kursstart	○	○	○	○
schema	○	○	○	○
kursguiden	○	○	○	○
lärplattformen CANVAS	○	○	○	○
inlämningsuppgifter	○	○	○	○
examination	○	○	○	○

Kommentar

Q8 8. Som student på kursen, hur väl tycker du att följande påståenden stämmer in på dig?

	Nej, stämmer inte alls	Nej, stämmer inte särskilt bra	Sådär, stämmer ganska bra	Ja, stämmer bra	Ja, stämmer mycket bra
Jag vill verkligen lära mig det här kursinnehållet	○	○	○	○	○
Jag lägger ner tid och energi på kursen	○	○	○	○	○
Jag deltar aktivt under lektionerna med frågor och kommentarer	○	○	○	○	○
Det är inte viktigt för mig att få bra betyg	○	○	○	○	○
Jag ser fram emot lektionerna	○	○	○	○	○
Jag läser sällan all kurslitteratur till varje moment	○	○	○	○	○
Jag ger mina kurskamrater konstruktiv feedback och hjälpsamma kommentarer i kamratgranskningsuppgifterna	○	○	○	○	○
Det är viktigt för mig att göra bra presentationer och inlämningsuppgifter	○	○	○	○	○

Q9 9. Vad tycker du har varit det bästa med kursen?

Q10 10. Om du fick förändra något med kursen för att förbättra den, vad skulle du föreslå?

Appendix 4: Group interview, questions

Group interview

(Date, teacher)

Themes to discuss in the semi-structured course evaluation:
Open questions "how do you feel about xxx", "what are your thoughts on xxx"

Course content

- The course as a whole: overall impression
- Balance between traditional and new
- Usefullness & relevance
- Multisensory activity: exercises, presentations, and peer-feedback
- Literature and course materials

Course structure

- Structure and rhythm: 50%, meeting every second week, hand-in assignments every second week.
- Online format: zoom-lectures and on-line assignments with peer-feedback online.
- Assignments and exams
- Information and course-portal (online information)

Student online: situation and activation

- Isolation/feeling as a part of the group
- Feeling comfortable presenting and commenting

Other comments

- Best of: what did you like the most?
- Measures for improvement
- Other suggestions and ideas