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Identifying Key Factors to Tailor a Modular Scientific Tour

A study of visitor purpose, guide tailoring, and interactivity in a pharmaceutical showcase tour

Master's thesis in Learning and Leadership

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DEPARTMENT OF COMMUNICATION AND LEARNING IN SCIENCE

CHALMERS UNIVERSITY OF TECHNOLOGY

Gothenburg, Sweden 2026

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Cover: Guide talking about drug delivery with university students in the dark room
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Abstract

The pharmaceutical industry is an integral part of global health and welfare, yet prior studies report public distrust due to perceptions of profit-seeking and unethical behavior. Addressing these misconceptions requires companies to be open about day-to-day work and impact. AstraZeneca’s modular, employee-guided tour, the *Amazing Journey*, is one such transparency initiative, and aims to inform visitors about the Gothenburg site and strengthen public relations. It welcomes many visitors every year, each with different purposes, so the tour’s content and route must remain flexible to effectively serve different audiences. This thesis examines how visitor purpose varies by group type, how guides tailor the tour, and how visitor-guide and visitor-module interactions support learning.

With the perspective of *Amazing Journey* as a non-formal learning setting for older teens and adults, we used cognition, group dynamics, science identity, learning interactions, and guide style to describe how positive visitor experiences can be created. Based on data from seven guide interviews, four teacher interviews, 23 tour observations, and a survey (n=178), we drew conclusions from the perspectives of both guides and visitors using thematic analysis and descriptive statistics. The results were presented in three visitor categories: upper-secondary students, university students, and business visitors.

Generally, student groups wanted connections to course content and exposure to work-active role models, whereas business associates sought context for collaboration and relationship-building. The visitors also sought an authentic experience, which in this context translated into a desired focus on laboratory work. Guides communicated with visitors to tailor tours to age, interests, prior knowledge, and practical constraints. Notably, the guides adapted stage presence, use of humor and anecdotes, narrative structure, tour route, technical depth, and language to tailor their tours. Tailoring also included adjusting the interactive elements, such as dialogue, questions, and use of interactive modules.

The study concludes that a guided tour seeking to leave a meaningful and lasting impression should utilize knowledgeable employees as guides, clarify the tour’s purpose, tailor the experience to the audience, and actively engage visitors.

Keywords: corporate showcase, STEM, guided tours, modular tours, pharmaceutical science, visitor experience, guide delivery, interactivity, audience tailoring, experiential learning, field trips.

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Additionally, we want to thank everyone who contributed to the data collection; especially the guides who participated in interviews and observations, but also the teachers who shared their perspectives, and the many visitors who took the time to complete the survey.

Finally, this thesis required patience, grit, and teamwork, so a big thanks to each other as this work has truly been a collaboration.

William Bergstedt and Rebecka Svanberg, Gothenburg, June 2026

Glossary

Below is the list of acronyms and specific words that have been used throughout this thesis listed in alphabetical order:

AJ	Amazing Journey
AZ	AstraZeneca
BioVentureHub (BVH)	An open innovation platform for independent companies to share expertise and equipment with AstraZeneca. Managed by the BioInnovationUnit (BIU).
The Dark Room	Common collective name for modules 4 and 5 (see Appendix A.4 and A.5)
GoCo	GoCo Health Innovation City. Life science innovation cluster in Mölndal.
HTS	High-throughput screening
ICAP	Interactive-Constructive-Active-Passive framework. Tool for measuring types of interactivity.
MST	Market Segment Theory. Perceived homogeneous groupings of a heterogeneous market or audience.
R&D	Research & Development
STEM	Science, technology, engineering, and mathematics
VIP	Very important people. Here in reference to visitor groups with more significance to the company and its operations.

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1

Introduction

The pharmaceutical industry plays a pivotal role for both individual health and global welfare. Through extensive research and development, the companies within the pharmaceutical industry contribute to increased life expectancy, the eradication of diseases, and more effective pain relief that improves patients' quality of life (Burke, 2020). Despite this, public opinion of the pharmaceutical industry is highly divided. A recent study examined factors that influence public trust in pharmaceutical manufacturers (Singh et al., 2023), and a substantial majority of the study's participants had low trust in the industry, which was often linked to perceptions of profit-seeking and unethical behavior in marketing (Singh et al., 2023). One way to address these preconceived ideas is to increase transparency by showing the site and educating visitors.

For more than a decade, AstraZeneca Gothenburg has operated an open-door policy, as far as feasible, to increase transparency and help the public understand what happens at a large pharmaceutical Research & Development (R&D) site. Each year, approximately 25,000 visitors are welcomed to the site to experience the Gothenburg site's environment, business, and research.

AstraZeneca hosts a wide range of visitors: government and industry representatives to understand the business ecosystem, family members to see the workplace, and importantly, students to be inspired to work there. Since 2017, AstraZeneca Gothenburg has showcased science and people on the site through the guided, modular tour *Amazing Journey*, designed to take visitors inside the site and present research, technology, and everyday practice in an engaging and accessible way. As the tour is attended by at least 5,000 visitors annually, its content and delivery should meet a high standard.

Accordingly, the tour's coordinator is exploring updates to the modules and content, and before making changes seeks to understand visitors' perspectives to inform what to improve and what to retain. This master's thesis offers both practical implications for AstraZeneca's continued development of the *Amazing Journey*, and implications for similar guided scientific tours for adults. Academically, the thesis examines how the content of an employee-guided, modular scientific tour in an industry setting can be delivered and tailored, based on feedback from visitors and guides. Below is a concise statement of the study's academic aim.

1.1 Aim and Research Questions

The aim of this study was to identify and evaluate the key factors that influence how a modular guided tour at a large pharmaceutical company can be tailored for different target audiences.

More specifically, the work was focused on three different areas (visitors, guides, and interaction) each targeted by one of the following research questions:

1. What do visitors hope to gain from the visit, and what similarities and differences emerge across target audiences?
2. How do guides at AstraZeneca tailor their tours to different visiting groups?
3. How can visitor–guide and visitor–module interactions support the learning in a modular tour?

1.2 Background

The *Amazing Journey* is a guided, modular tour that can be tailored to each visiting group, and any employee can lead it by sharing their story and perspective on the site and its research. To support this broad pool of guides, the team produced a script that standardizes what is typically said at each module, including key descriptions, numbers, and statistics. As a project leader behind the *Amazing Journey* explained, “we [drew up] this script which actually meant that we now have 3,000 guides purely in terms of facts”, since anyone can learn the tour content from the script.

The *Amazing Journey* consists of ten modules, including facts about the site and its history, the drugs developed and the stories behind them, the therapeutic areas, and information about drug development, videos from the labs, and much more. Descriptions and visualizations of the modules are provided in Appendix A. A tour lasts approximately 40–90 minutes, and the allotted time limits how in-depth the tour can be. Another dimension of adaptation concerns the topics included. In general, the *Amazing Journey* spans five areas – AstraZeneca Gothenburg’s history; what it is like to work at the site; the drugs developed and their benefits for patients; the research, technology, and science used; and AstraZeneca’s overall vision and goals. Visiting groups may be more or less interested in some of these topics, which requires the guides to tailor the tour. Over time, guides and visit coordinators have learned, through experience, which content and delivery approaches suit different groups and what each target audience most wants to hear and learn about. We will investigate what the different visitors want, and how the guides tailor the tour to that.

In 2019, an external quality review of the *Amazing Journey* was conducted by a group of Chalmers students to evaluate the experience from a guiding perspective (Bergström et al., 2019). The team provided feedback on module design, the tour script, guide delivery, and guide training, as well as on supporting materials and processes. Bergström et al.’s (2019) overall conclusion was that the exhibition and

its enabling infrastructure were functioning well and were positively received by guides. One recommendation they gave for future work was to develop a clearer, evidence-based understanding of visitors' experiences of the exhibition, which is something that will be examined with this thesis work.

1.3 Delimitations

This project focuses on how guides adapt the tour in real time and how those adaptations affect visitors' experiences. It does not provide detailed redesigns of individual modules; instead, it offers insights that can inform future changes. We also did not assess guide support tools, like the script, or how such materials influence employees' willingness to guide.

The study includes a wide range of audiences, excluding children under 15. This exclusion was made due to two reasons. First, upper-secondary students [*Swedish: gymnasieelever*] are the youngest audience the *Amazing Journey* is designed to accommodate. Second, ethical constraints, as younger children cannot provide informed consent to participate in the study.

Another delimitation concerns the groups included. For practical and anonymization reasons, we excluded most very small groups (fewer than 5 people) and all unplanned visits (absent in the booking calendar). This also shaped which guiding formats the report could consider. Visitors do not move around the site without a liaison, and if the *Amazing Journey* was part of the visit, the liaison is treated as a guide in this thesis. However, compared to larger and pre-planned events, such guides may have been less prepared or less experienced with guiding, so their purposes or guiding styles may notably differ from the patterns outlined in this thesis.

The research takes place at a large, biomedicine-focused Research & Development site in the pharmaceutical industry in Gothenburg, Sweden. Therefore, the findings are shaped by this organizational context and are most applicable to similar settings. We do not examine smaller companies, other sectors, or different sites, so our conclusions should not be assumed to directly apply beyond comparable environments.

Finally, this study focuses more on upper-secondary and university students than on industry peers, corporate-affairs visitors, or internal audiences. It was easier to observe student tours and collect interviews with teachers and survey responses from students, while joining business-oriented visits – and asking high-profile visitors, busy internal stakeholders, or trade-union representatives to fill out the survey – was often not possible. As a result, more evidence was collected for student visits, and less for business-oriented visits, and this balance is reflected in the report.

1.4 The Use of AI

In this thesis, AI was used for generating initial transcriptions of interviews as well as an aid in text editing, the latter including corrections to grammar and suggestions for more concise or clear wordings.

2

Theory and Previous Research

This chapter establishes the study’s theoretical foundation by integrating learning theories relevant to guided tours and modular science exhibitions (Section 2.1) for diverse target audiences (Section 2.2). It also reviews literature on human cognition to investigate how module design and interactivity might shape learning during a modular tour (Section 2.3). Finally, interpersonal factors relevant for tours are discussed (Section 2.4): including guide style, role models in STEM, and group dynamics.

2.1 Learning Foundations in Non-Formal Settings

In the context of AstraZeneca’s guided tours, visitor learning is one of the clear intended outcomes, along with creating a positive and memorable experience. However, the learning situation differs quite a bit from the traditional schooling that might first come to mind. It is important to consider the learning situation when evaluating other aspects of learning delivery. To further understand how learning might take place during a tour of the *Amazing Journey* non-formal learning (Section 2.1.1) and Kolb’s model of experiential learning (Section 2.1.2) are explained below. Moreover, Section 2.1.3 provides a background to key actions a teacher can take to enhance learning from a field trip.

2.1.1 Non-Formal Learning

Learning situations are often complex, and best practice can vary with the specifics of the situation. One factor that can be used to categorize a learning situation is the formality (Merriam et al., 2006). The formality can be thought of as a sliding scale dependent on several factors of the learning-delivery design (see Figure 2.1). However, it is often divided into three distinct groups: formal, non-formal, and informal learning (Johnson & Majewska, 2022; Merriam et al., 2006). It should be noted that the last two are not always consistently defined across authors, and this study uses the definition provided by Johnson and Majewska (2022) that stems from a literature review on the subject. On one end of the scale, we find formal learning, which according to Johnson and Majewska (2022) is characterized by institutionalization, written curricula, and a focus on imparting conceptual knowledge rather than practical know-how. Formal education encompasses all official school education from lower primary to university. On the other end is informal learning that

often can occur without the learner even noticing. Johnson and Majewska (2022) notes that with its lack of clear structure, a focus on learner needs, and emphasis on emotional, social, and behavioral aspects in addition to the cognitive, it is a more incidental and often learner-driven process. The category of most interest for this report, however, is non-formal learning, which falls somewhere in the in-between. It carries some similarities to both in that it (Johnson & Majewska, 2022):

- can be more or less structured and may include a written curriculum,
- involves emotional, social or behavioral elements in addition to cognitive, and
- is voluntary, intended and recognized by the learner.

The *Amazing Journey* can, by this definition, be considered as a non-formal learning situation as it is clearly intended, structured around a set of learning objectives, pre-planned but flexible, not documented or certified, outside of an educational institution, and experience-based.

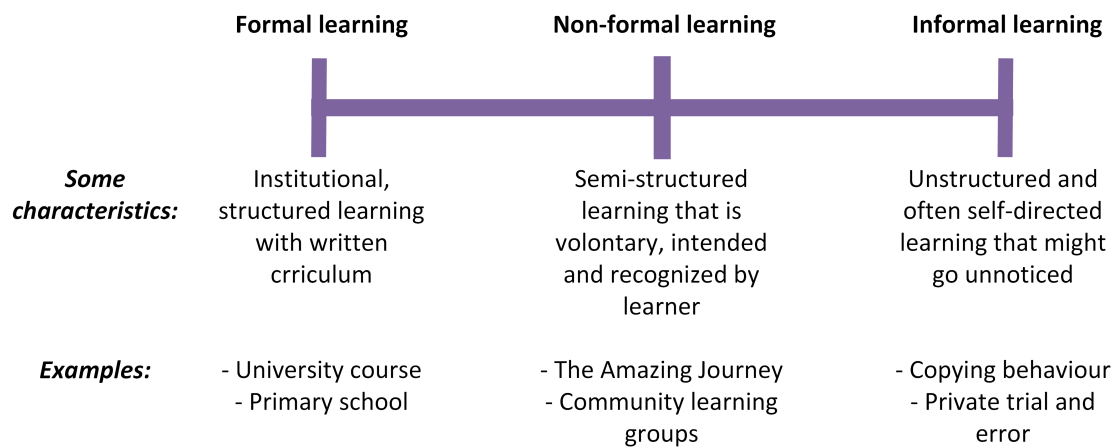


Figure 2.1: Learning formality visualized as a scale with three major categorizations.

Johnson and Majewska (2022) notes that one benefit of non-formality is that authentic contexts spark motivation and engagement, reduces abstraction, and creates value by linking knowledge and experience. The inherent flexibility that comes with a less structured approach also benefits tailoring to the needs and wants of the learners. Non-formal learning contexts (such as out of school activities) have moreover been shown to have a positive impact on both interest and long-term memory retention. Johnson and Majewska (2022) also acknowledges some potential disadvantages to consider, one of which is that the lower degree of structure can also mean variability in practice and execution, which in turn might impact the efficacy. Furthermore, the educator might have a harder time connecting new concepts to prior knowledge because of the lack of a unifying knowledge base across the group of learners.

2.1.2 Experiential Learning

One purpose of field trips or similar visits outside of ordinary education is to learn through experience. Kolb's (1984) Experiential Learning Theory was inspired by the works of John Dewey (Dewey, 1986), Kurt Lewin (Adelman, 1993), and Jean Piaget (Pakpahan & Saragih, 2022). It integrates Dewey's focus on learning from experience, Lewin's emphasis on the action research cycle (an iterative methodology for practical problem solving) and laboratory training, and Piaget's cognitive development stages (degrees of mental maturity), to describe what role active engagement has in learning.

Kolb's (1984) Experiential Learning Theory describes knowledge as created through the transformation of experience in a four stage-cycle: concrete experience, reflective observation, abstract conceptualization and active experimentation. It suggests that if a learner progresses through this four-stage cycle, their experiences will be transformed into effective learning. Kolb's learning cycle is visualized in Figure 2.2. Kolb (1984) states that a person can enter the cycle at any stage and follow it through the cycle's sequence. However, effective learning is most likely when the learner completes all four stages of the model. Skipping any stage reduces effectiveness compared with progressing through the entire learning cycle. As Kolb's model implies, "Memorization or recollection of ideas taught does not equal learning" (Kurt, 2020, para. 4); something must be generated from the experience for it to count as learning.

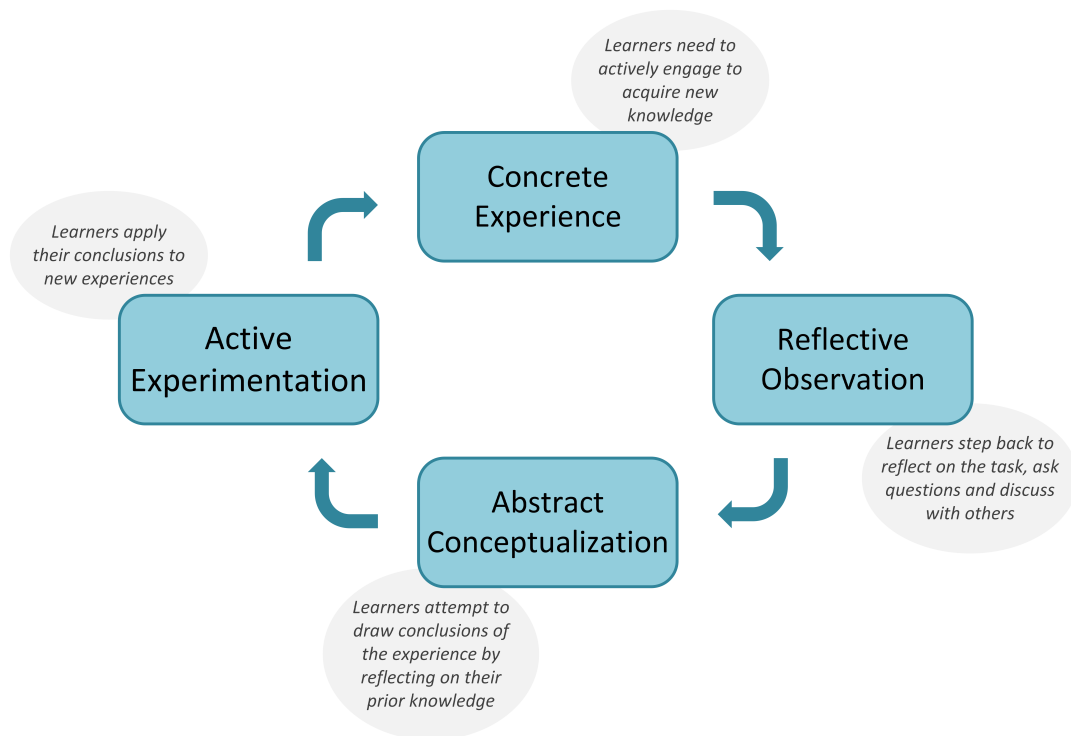


Figure 2.2: Kolb's Learning Cycle containing the four stages; concrete experience, reflective observation, abstract conceptualization and active experimentation (Kolb, 1984).

By recognizing the importance of each stage, educators can create environments that promote active engagement and deeper understanding. In summary, Kolb's learning cycle emphasizes the importance of experiential learning and reflection in the learning process, making it a valuable tool for educators and learners alike (EduCorpus, n.d.).

Field trips are a kind of designed learning experience that should enable students to move through the Kolb's learning cycle's four steps (Behrendt & Franklin, 2014). The visit alone provides the concrete experience; structured reflection activities help students make sense of observations; guided activities enable forming ideas from their experiences; and follow-up applications in the classroom (e.g., projects, labs, or discussions) support testing ideas in new contexts. Behrendt and Franklin (2014) state that the purpose of using the experiential learning model in field trips is to facilitate deeper processing of the experience and remembering to link it to prior knowledge. The authors emphasize that this takes time and that the effect is stronger when students have more prior connections to anchor new impressions to. This can be tied to the concept of building on existing schemas, which is further explained in Section 2.3, and the preparation and follow up surrounding field trips, explained in next section.

2.1.3 Preparation and Follow-up for Field Trips in Formal Learning

For student visitors, the visit's purpose is easier to define because it sits within a formal, standardized educational context: with curriculum goals, course syllabi, lesson plans, assessments, and teacher guidance. This documentation helps to clarify which objectives to target, what prior knowledge to assume, and how the visit links to the course content. As previously mentioned in Section 2.1.2 on experiential learning, field trips can function as a way to target the concrete experience part of the cycle. However, it is also noted that the work undertaken before and after the field trips plays an important role in learning. Behrendt and Franklin's 2014 study covered how well-planned, curriculum-integrated school field trips in science can be powerful experiential learning tools that increase students' motivation, interest, and understanding. The authors' primary conclusion is that the value of a field visit often depends on the teacher's broader instructional work (Behrendt & Franklin, 2014).

Before the visit, the teacher should ideally pre-visit the site, ensure that the setup works for all students, and reduce the "novelty space" (the risk of overstimulation in a new environment) by orienting students to the setting, goals, activities, and behavioral norms. During the visit, the teacher needs to be active and model how to investigate, ask questions, and connect to the curriculum rather than simply "handing" over the class to venue staff. The authors explain that worksheets can help maintain focus, but they should be designed to support exploration and dialogue rather than mechanical "fill-in". Also, the teacher should be prepared to interpret the guides' explanation at the venue to any unfocused or confused students. After the visit, reflection and follow-up are essential: discussions, assignments, presenta-

tions, and continued connections throughout the term are needed for the experience to become long-term learning and interest rather than short-lived impressions. With support of a U.S. study, Behrendt and Franklin (2014) argue that elementary and secondary grade level teachers are not taught the pedagogy or methods necessary to plan and orchestrate field trips. But, once teachers are empowered and learn how to develop and orchestrate a successful field trip, they will be more inclined to schedule those.

2.2 Making Target Audience Adaptations

Learning is a deeply individual process which means that another important aspect to consider when designing a learning situation is who the learning is intended for (Merriam et al., 2006). The information and delivery needs to be tailored to the target audience. One major challenge for *Amazing Journey* is its diverse range of target audiences, as the tour must meet the needs of several distinct groups. The target audiences vary on several key aspects such as: age, technical knowledge, experience, areas of interest and so on. In order to effectively tailor the tour, the guides need to be able to separate groups based on some easily measurable characteristics. In this thesis, the concept of Market Segmentation Theory (Section 2.2.1) will be used to look at how guides are able to separate and identify the aims for different groups. Additionally, since the *Amazing Journey* is designed and intended for adult or almost-adult audiences, this also informs what kind of learning might be relevant. When considering learning for adults, perhaps one of the most prominent theories is Knowles' andragogy, which is explained in Section 2.2.2.

2.2.1 Market Segmentation Theory

As a form of organizational showcase, the *Amazing Journey* can be compared to a form of marketing for the site. It is for example a possibility for AstraZeneca to reach potential future hires or collaborators even if the goal is primarily to inform about their work and not marketing in the traditional sense. This marketing viewpoint also gives a new perspective on target audience through Market Segmentation Theory. Market segmentation is the idea that a broader and heterogeneous market of consumers can be thought of as smaller homogeneous groups depending on different aspects of their wants and needs. Wedel and Kamakura (2000) emphasizes that this segmentation is not an actual empirical partitioning, but specifically stems from the organization or managers' conceptualization of the market as structured and partitioned. This imagined partitioning is done on the grounds of so called segmentation bases, which are a set of characteristics or variables that split the broader market. Generally, segmentation bases are split both on how general or product specific, as well as observable or unobservable they are (Wedel & Kamakura, 2000). The observability, as the name suggests, concerns how easy it is for a provider to judge what segment a specific person would fall under. Things like geography, culture and usage statistics for a product can all be clearly defined and are thus observable. Compare this to "unobservable" things like life-style, values, product-benefit perceptions and brand attitudes.

In this study, market segmentation is relevant in order to discuss the guides' ability to identify the wants and needs of a group by imagined sectioning of group types. Segmentation based on occupation and age (a partitioning common for the *Amazing Journey*) is a general observable basis for segmentation, which has both strengths and weaknesses (Wedel & Kamakura, 2000). On the one hand, such segmentation generally perform well on identifiability, substantiality, accessibility, and stability. Identifiability is the ease with which managers can determine which segment a customer belongs to (Wedel & Kamakura, 2000). Substantiality means each segment is large enough to justify treating it as a distinct group. Accessibility refers to how easily a segment can be reached with targeted efforts. Stability concerns how much a segment's composition or interests change over time. On the other hand, general observable bases for segmentation tend to be weaker on actionability and responsiveness. A segment is responsive if it "responds uniquely to marketing efforts targeted at them" (Wedel & Kamakura, 2000, p. 4), and actionable if, once identified, the firm can feasibly tailor its marketing mix to meet that segment's needs in a way that aligns with the organization's objectives and strengths.

2.2.2 Andragogy and the Adult Learner

The tour is meant to accommodate adult and near-adult audience groups, and its design should reflect that. Knowles' theory of andragogy is based on adult learners, and assumes that they can be described from a set of six assumptions (Merriam et al., 2006):

1. Self-direction - Adults' concept of self becomes more self-directing as they age, moving away from the child's dependent personality.
2. Experience - An adult naturally have a greater abundance of lived experiences which they carry with them into any learning situation.
3. Readiness - How willing or ready an adult is to learn depends partly on how relevant they consider it to be to tasks, transitions or problems in their lives, be that for their work or personal life.
4. Time perspective - Immediate applicability of the knowledge learned is also of increased importance to adults as they mature. Having a more problem centered mindset than children who might be more willing to accept learning for potential future use.
5. Motivation - Adults are more driven if they have internal, rather than external, motivating factors.
6. Need to know - More so than children, adults also feel a need to know why they need to acquire a new piece of knowledge.

Holton et al. (2025) notes that adults, by having accumulated a lot of different experiences, often make for more heterogeneous groups regarding for example; background, motivation, interests, and goals. Moreover, they state that "the richest resources for learning reside in the adult learners themselves" (Holton et al., 2025,

p.4), which is why activities with emphasis on learner activity and sharing of experiences are emphasized in adult education. Visitors of AstraZeneca vary widely regarding their prior experience, but everyone can be assumed to have some existing knowledge of, and personal relation to, medicines. This should be considered when deciding what content to include.

The remaining assumptions (Holton et al., 2025) all express some need for the learning to be adapted to the learner. By, for example, including the learner in the planning of the tour content, you can accommodate self-direction and ensure the information is immediately relevant and applicable to their situation. Then, the learners may also understand why they need to know this information and, in turn, feel more motivated to engage. Thus, all of these assumptions are in some way of value to consider for the *Amazing Journey* and it is relevant to include the learner in specific adaptations made.

Although these assumptions are made about the “adult” learner, Merriam et al. (2006) argues that it can still be applicable for children when viewed as one end of a scale from more teacher-directed to learner-directed approaches. Pedagogic approaches are targeted at children and are often more teacher-directed. However, the fit of a pedagogic or andragogic approach might be more dependent on the situation and the learners’ level of expertise on a subject. With this in mind, these principles for the adult learner will as mentioned above be applicable for most of the visitor groups as they are old enough (15 or older) to be a somewhat self-directing.

2.3 Cognition and Module Design

The learning happening during the *Amazing Journey* can also be framed through Piaget’s processes of assimilation and accommodation (Piaget, 1952). As mentioned in the Introduction, visitors arrive with preconceived ideas about what a pharmaceutical company does and perhaps some related technical knowledge. In Piaget’s model, this existing and interconnected information is organized into cognitive structures called *schemas*. The existing schemas will have an important effect on the learning during the tour as new information needs to integrate into the already existing cognitive structures. Addition of information without changing the schemas is known as *assimilation*. *Accommodation*, on the other hand, occurs when that new information cannot fit into existing structures, which forces the learner to modify their understanding to fit their cognitive structures.

Piaget’s ideas are closely related to many other models on cognition and how the human brain works. In this thesis, cognitive load theory (Section 2.3.1) and scaffolding (Section 2.3.2) is used to describe the mental processes the designing of a modular tour needs to account for. Section 2.3.3, then uses the Interactive-Constructive-Active-Passive framework to relate different forms of interactivity to learning effectiveness. Finally, studies of similar modular exhibitions (Sections 2.3.4 and 2.3.5) offers further practical guidance for the design of tour content and structure.

2.3.1 Cognitive Load Theory

Cognitive load theory explains how memory and attention support learning and offers practical rules of thumb for designing learning materials (Sweller et al., 2011). In this study, it is relevant to module design, and how both guides and visitors interact with the modules. Some of the effects explained by cognitive load that should be considered for the *Amazing Journey* are: the split-attention, modality, redundancy and expert reversal effects. But first, we provide a summary of the basic mechanisms of cognitive load in the next paragraph.

As mentioned in the introductory text to Section 2.3, the human long-term memory can be thought of as a large bank of information linked into clusters called schemas (Piaget, 1952). The working memory is the mental capacity that assimilates or accommodates new information into these schemas, and the load placed on the working memory by these processes is referred to as the cognitive load (Sweller et al., 2011). Since the working memory’s capacity is limited, cognitive load becomes important to consider when wanting to facilitate learning.

Sweller et al. (2011) propose that there are two categories of cognitive load; intrinsic load and extraneous load. Intrinsic load considers the strain caused by the very nature of the information. In summary, the intrinsic load increases with increasing interconnectedness and complexity of the information. To reduce intrinsic load one can build learning to rely on existing schemas, i.e., the learner’s prior knowledge. The extraneous load concerns how information is presented and how learning activities are designed (Sweller et al., 2011). For example, step-by-step examples reduce it, whereas showing only the problem and final answer forces learners to infer steps and split attention, making learning harder. Should the combined size of the intrinsic and extraneous loads exceed the working memory’s capacity, learning efforts will most likely fail in some way. That’s why the following effects should be considered to reduce cognitive load.

The split-attention and modality effects both considers situations where the new information is presented from two different sources that needs to be simultaneously considered to be intelligible (Sweller et al., 2011). Situations where the split attention effect is applicable are characterized by having two sources of information are separated by time or space. For example, having to flip between two sections of a book would be such a separation and would impose a heavier extraneous load which could hinder learning. Consequently, Sweller et al. (2011) suggests that information should as far as possible be integrated to aid the linking process. Unlike split-attention, the modality effect instead concerns information split by the auditory and visual. Explaining a visual diagram verbally instead of in text, for example, will by this principle be less mentally taxing than corresponding visual-visual designs since both auditory and visual channels of the working memory will be engaged.

Redundancy aims to reduce unnecessary information that could otherwise take away mental processing capacity from the essential. Sweller et al. (2011) describes that redundancy can be found both in the content and the modality of the information. Firstly, redundancy in content refers to when the information itself is cluttered with unrelated details that the learner needs to filter out. Sometimes, this is also re-

ferred to as the coherency effect (InnerDrive, 2025). Secondly, for the modality effect to work the information should be complementary, not duplicated, as this also causes redundancy (Sweller et al., 2011). Although redundancy is unwanted, it is also crucial to consider the learner’s level of expertise when judging what might be redundant. This is described by the expert reversal effect, which is “when information beneficial to novice learners becomes redundant to those more knowledgeable” Sweller et al. (2011, p. 155).

When designing modules it is thus ultimately important to consider how they will be interacted with. One should use these rules of thumb to aim to reduce unnecessary cognitive strain as to let the learner focus on understanding the content and not deciphering it.

2.3.2 Scaffolding in Scientific Guided Tours

In science communications, *scaffolding* is adaptations that make complex ideas easier to grasp by providing temporary, targeted support that lower cognitive load (Nance, n.d.). Scaffolding should in other words consider the needs of the learner, and work to reduce the expert reversal effect (described in the previous section) by successively removing redundant support. Scaffolding is especially relevant for Amazing Journey guides working with audiences without a scientific background — particularly upper-secondary students — so that visitors can access and understand the content.

Scaffolding also offers a useful lens for how science mediation turns curiosity into learning (Vigneron et al., 2025). In one study, mediators used simple, adaptive moves — asking guiding questions, offering brief explanations or examples, and highlighting key ideas — and then faded the support as students took over. The study identified two phases: a “science” phase, where questions and short explanations help students make sense of phenomena, and a “creative” phase, where prompts and reminders keep designs grounded in real science rather than “magical” answers. The core practice is to spark exploration first, then scaffold the connection from metaphor to science by tailoring support to the group and gradually withdrawing it as understanding grows.

2.3.3 The Interactive, Constructive, Active, Passive Framework

Where the previous sections focused on how information is presented, this section examines a tool for creating interactivity. Activity, engagement and interactivity has in many contexts been suggested to enhance learning, but one might also want to distinguish between different levels of activity. For this, the ICAP framework (Interactive, Constructive, Active, Passive) is useful, as it refers to a proposed taxonomy of learning activities’ effectiveness and the depth of the learning. Chi (2009), the founder of the taxonomy, suggests that interactive activities are superior to constructive, constructive superior to active, and active superior to passive (see Figure 2.3). This order was determined through pair-wise contrasting of activities based on their effectiveness as suggested by previous studies.

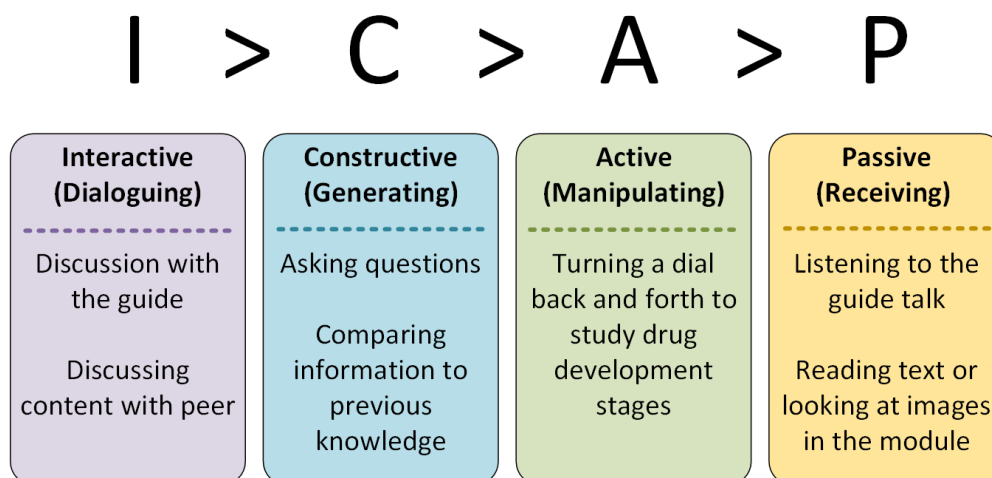


Figure 2.3: The ICAP framework as described by Chi and Wylie (2014) with examples of learning activities relevant to the Amazing Journey.

Passive engagement is defined as “learners being oriented toward and receiving information from the instructional materials without overtly doing anything else related to learning” (Chi & Wylie, 2014, p.221). This characteristic receiving of information might include listening to a lecture or video, or reading a text passage. In comparison, active engagement is characterized by physical action or manipulation. Perhaps rewinding the video, rotating an object, copying solution steps, taking verbatim lecture notes, or highlighting the text passage. Next, constructive engagement is defined as “activities in which learners generate or produce additional externalized outputs or products beyond what was provided in the learning materials” (Chi & Wylie, 2014, p.222). For example, taking notes in one’s own words, drawing diagrams, asking questions, and relating information to prior knowledge. Finally, when it comes to interactive engagement Chi and Wylie (2014) notes that there is a distinction to be made between what is in this report referred to as physical interactivity compared to interpersonal interactivity. Though variations of both of these can fall under different ICAP levels, depending on how objects or information is manipulated or what kind of discussion is had for example, Chi and Wylie’s definition of Interactive engagement concerns dialogue and should thus be considered a version of interpersonal interactivity. However, they note that this dialogue must also meet two requirements; “both partners’ utterances must be primarily constructive, and a sufficient degree of turn taking must occur” (Chi & Wylie, 2014, p.223).

2.3.4 Designing Modules for Learning and Engagement

Allen (2004) argues that science museum exhibits should be intentionally designed for learning rather than mere entertainment, by integrating clear learning goals, a clear storyline for the key concepts, and learner-focused scaffolding such as prompts, guidance and feedback. The author states that learning is enhanced when exhibits make underlying scientific ideas visible, connect to visitors’ prior knowledge, and

provide multiple entry points for diverse audiences.

Generally, interactive features in module design combined with clear guidance about the underlying concepts lead to deeper and more transferable learning than exhibits designed mainly for attention or novelty (Allen, 2004). Also, effective exhibits need to be intrinsically motivating at every step to keep visitors focused and engaged. The designers should reduce mental effort where it does not serve learning, by making purpose, controls, and possible actions immediately clear and straight-forward, and place cognitive challenge where it does, by guiding visitors to notice, predict, manipulate, and explain phenomena linked to the core ideas (Allen, 2004).

Allen (2004) provides several design focus areas, with concrete tips. First, use hands-on engagement to boost attention, enjoyment, and memory, especially with live or changing phenomena. However, interaction should be optimized, not maximized, and the amount and type of interaction should be adjusted so it serves explicit learning goals, rather than adding activity for its own sake. Second, make the core scientific idea visible and connect visitors' actions to outcomes with timely feedback; because visitors interpret literally, support abstract ideas with careful environmental cues and interpretive media that guide explanation, not just manipulation. Third, apply universal design so exhibits work for everyone; for different preferences and abilities, for novices and experts, for young and adult visitors, and both solo and group use (Allen, 2004).

In practice, effective design balances clarity and challenge at multiple scales—from gallery orientation to individual exhibit to label wording—to minimize cognitive overload while sustaining curiosity. Repeated formative testing with visitors can reveal that small adjustments to labels, control placement, and timing can improve visitors' understanding of key ideas.

2.3.5 Collaboration between Module Design and Guides

In *Amazing Journey*, the module design is important to consider in the context of how the guides will utilize the modules. An example of a similar exhibition is “Do you speak quantum?”, in Zürich, Switzerland, that was studied by Decaroli and Malinowski (2022). It was an interactive art exhibition within quantum physics that is similar to the setup of the *Amazing Journey* with its modular design and expert guides. Two thousand visitors were introduced to the world of quantum to raise awareness toward quantum computing for policy and government officials, and to inspire the general public (Decaroli & Malinowski, 2022). Each installation was designed as a stand-alone module with one clear idea, a simple way to interact, and a strong visual hook. This modular design has three aims: to make it easy to join at any point without prior knowledge (accessibility); to support multiple levels of engagement, from a quick art encounter to a deeper guided conversation; and allow the pieces to be exhibited together or individually in different places. The design prioritizes simple entry, with clear controls and immediate feedback, seeks strong impact through a distinct visual identity and selected multisensory elements, and uses a shared theme, the “language of quantum”, to link all modules. Scientific ambassadors serve as an optional layer, offering brief, accessible explanations when

desired, where each installation was explained in between 5 and 20 minutes by the ambassadors.

Decaroli and Malinowski (2022) explains that the visitors were deeply engaged and that the installations successfully provoked questions, such as “How does this work?” and “What does this piece represent?”, which led to discussion with the ambassadors. Also, several high school classes visited the exhibit, where each ambassador guided a small group of five to seven students through each piece. Here, the ambassadors acquired qualitative feedback verbally from the visitors, but did not collect any formal responses. In conclusion, the authors argue that using interactive installations to provoke questions and inspire visitors is a powerful way to introduce them to complex concepts. The visitors engaged in the installations reported being filled with interest and fascination for the language of quantum technologies and this is, as stated in Section 1.2, similar to the purpose of the *Amazing Journey*.

2.4 The Impact of Human Interaction

The previous sections have covered the learning situation, intended audiences, and design principles for content and structure. However, much of the learning in guided tour occurs between people, especially from the guide to the visitor. This section introduces concepts of human interaction relevant to scientific guided tours: the impact of role models on science identity, guide rhetoric and delivery, and group dynamics.

2.4.1 Science Identity and Guides as Role Models

According to Mills and Katzman (2015), research within science communication shows that well-designed field trips can strengthen students’ “science identity”, their sense of themselves as people who do science, by increasing interest, enjoyment, and intentions to engage in science activities. Short, hands-on experiences outside the classroom boost these perceptions in a reliable way, and the effects are stronger when students meet and interact with relatable role models. Applied to the *Amazing Journey* the guides with research background can inspire and encourage the students for studies and work within science by translating curiosity into personal relevance for the visitors.

Building on this, research indicates that role models play a crucial role in shaping a student’s science identity, personal growth, and overall sense of belonging, particularly for underrepresented minorities in STEM fields (Aish et al., 2017). The stories in the *Amazing Journey* highlight the “outliers” – researchers with highly distinctive success stories. Such figures can accidentally suggest career paths that are not realistic or achievable for the majority of students (Aish et al., 2017). The authors also note that when role models are extreme outliers, underrepresented students may often find it difficult to visualize a realistic path to achieving similar success themselves.

To foster a stronger science identity, the literature suggests to instead focus on “non-

outliers” Aish et al., 2017. These are everyday individuals in scientific settings, plentiful at Research & Development sites, who represent feasible and highly relatable pathways to professional success (Aish et al., 2017). Employees who guide the *Amazing Journey* therefore have a valuable opportunity to inspire visiting students toward science, the industry, or STEM more broadly, because they are non-outliers. Such role models often share core qualities that students value most (Aish et al., 2017):

1. achieved success,
2. continuous improvement and resilience
(including the ability to overcome failures),
3. moral character,
4. relatability, and
5. empathetic and helpful behavior.

By meeting relatable role models who show these traits, attendees of the *Amazing Journey* can develop a stronger sense of belonging and more readily picture themselves starting, or continuing, their STEM pathway (Aish et al., 2017).

2.4.2 Guide Rhetoric and Presentation

The guides’ delivery and rhetoric are powerful tools for helping diverse audiences grasp abstract scientific concepts in a pharmaceutical context. Drawing on an exploratory factor analysis of 243 tour leaders, Tsaur and Teng (2017) identified twelve tour guiding styles. Of these, six are most relevant to an educational business setting like the *Amazing Journey*: eloquent, elaborate, fully prepared, customer-oriented, cultural ambassador, and humorous (Tsaur & Teng, 2017). In the context of our study, this means:

- Eloquent: Guides are able to communicate science clearly, persuasively, and with grace.
- Elaborate: Guides being able to go beyond the script when useful, adding side notes that deepen understanding without losing focus.
- Fully prepared: Guides are prepared with tailored content, module selections, and clear takeaways-both the key messages and the feelings they want visitors to leave with.
- Customer-oriented: Guides are welcoming and adaptive in language and tone, aligned with the group’s expectations and needs.
- Cultural ambassador: Guides are able to provide their picture of the science and how it is to work at AstraZeneca.
- Humorous: Guides being able to create a calm, open, and relaxed atmosphere, including by being willing to laugh at oneself.

These styles are only part of the picture. Guiding the *Amazing Journey* also requires adjusting in real time, being aware of different cultures, and using space, timing, and interaction well to support learning for the visitors.

Other important delivering factors from another study for maintaining students' engagement and focus throughout a learning session include storytelling, demonstrations, hands-on activities, and, again, use of humor in teaching strategies (Masek et al., 2019). The authors conclude that teachers, in engineering education, including three to five instances of humor related to the content every 50 minutes of teaching helps students to stay focused and engaged for the entire session. They also note that "humor was one of the pedagogical factors that triggered students' emotional engagement that influenced learning-related interaction" (Masek et al., 2019, "Introduction", para. 3). For the *Amazing Journey*, this is a highly relevant consideration for guides seeking to increase engagement and curiosity.

Moving on, another way to help the audience understand scientific abstract concepts is through vivid metaphors and dramatic expressions, to lower the cognitive threshold, and shifting visitors from passively receiving information to actively participating in the cognitive process (Xia et al., 2025). In the natural sciences, using emotionally intense, enthusiastic and vivid words—high-arousal language—can significantly shorten the psychological distance between the visitor and the guide (Xia et al., 2025). Xia et al. (2025) found that high arousal language is especially effective to stimulate interest and improve museum visitor's experience if the content is natural science.

On the topic of distance, the physical distance to the guide can also matters for the engagement levels of the students. Dong et al. (2021) found that in a classroom setting, the students closer to the teacher showed higher engagement. Implying that, in the *Amazing Journey*, guides should both keep groups close to reduce the physical distance, and deliver messages in an expressive and enthusiastic way to reduce the social and cognitive distances, which Xia et al. (2025) and Dong et al. (2021) means can awaken the audience's curiosity and desire to explore.

2.4.3 Social Dynamics in a Visiting Group

Another thing to consider for the visiting group is the social dynamics that might affect the situation. Interactions between both guide-visitor and visitor-visitor will be dictated by rules and forces of psychological, sociological, anthropological, and political origin (Psychology.Town, 2025). Consequently, the interactivity of the tour can not be considered only from the isolated view of one participant, and the social context needs to be accounted for. Here we will mainly focus on how group maturity and size might affect willingness to engage and ask questions.

Group maturity has been explained by several models and theories, two of which have been summarized by Vaida and Serban (2021); Wheelan's integrated model (Wheelan & McKeage, 1993) and Tuckman's team stages (Tuckman & Jensen, 1977), both explained in Figure 2.4. They can give an understanding of how existing relationships and social dynamics within a group affects how the visitors interact

during the tour. For instance, a group in stage 1, with no or few existing relationships, might be more prone to politeness, tentativeness, and higher anxiety relating to how the individual is perceived by the group. In contrast, a stage 3 group with established connections might feel a greater sense of psychological safety and trust, and as a result be more inclined to interact and question (American Psychological Association, 2024; Vaida & Serban, 2021). The American Psychological Association (2024) states that a leader can have an impact on creating psychological safety by for example encouraging team members to raise what is on their mind and leading by example in a nonjudgmental manner. The guide might for the *Amazing Journey* be considered such a leader, but a teacher for a student group or another external organizer might also fill a similar role of greater perceived responsibility.

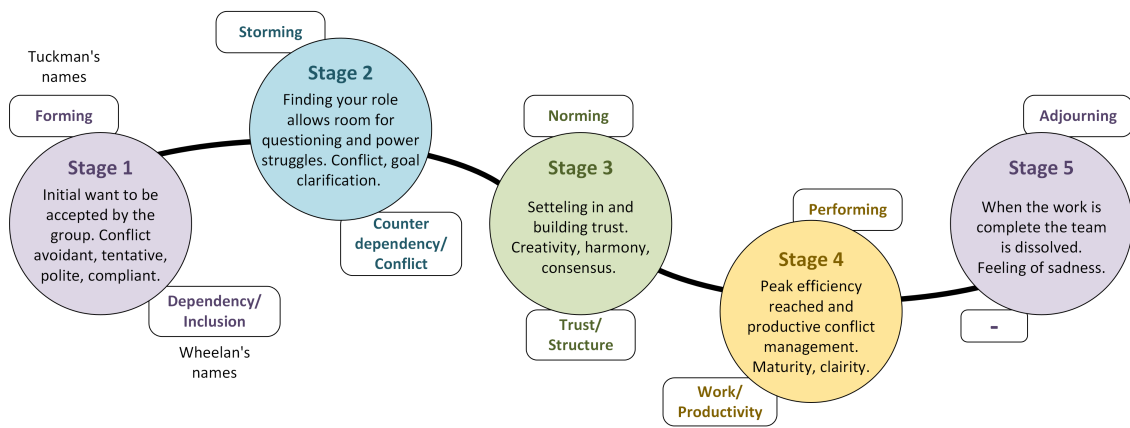


Figure 2.4: Summary of Tuckman's (names on top) and Wheelan's (names on bottom) theories for team development.

Moreover, psychological safety can also be connected to willingness to ask questions. A study by Chan and Smith (2024) investigated large class engagement in higher education students in Hong Kong. It concluded that social pressures, namely fear of judgment and risk of negative impact on one's reputation, were major factors for Chinese students' unwillingness to ask questions in a larger group. Similarly, Bergey (2024) studied points of consideration in the decision to ask or withhold questions during class for graduate students in a public university in the United States. They uncovered that anticipating and managing social impressions, like the perceived question quality and the social acceptability of the knowledge gap, was one of three areas dictating student's decision to ask questions. The other two being; determining if help is needed, and considering effects on others. This is one example of how interactivity and social dynamics might interplay.

Group size can also be expected to have an effect on the social pressures. Soboroff et al. (2020) showed that increased group size had a negative impact on both group trust and group commitment in their US study when considering groups of 3 to 8 people. Additionally, Chan and Smith (2024) features the teacher view that large group size hinders interactions between student-teacher and student-student. Moreover, El-Mansy et al. (2024) found some support for the idea that larger groups can mean lower cognitive engagement measured by the ICAP framework that was

explained in Section 2.3.3. El-Mansy et al. (2024) found that “only a portion of the group typically demonstrates Interactive engagement, while the remaining students show lower modes of engagement” (El-Mansy et al., 2024, ”Conclusion” para. 8). In summary, size and existing dynamics of a group will most likely affect both the actions and the experience of the tour.

3

Method

A summary of the methods used in this study can be found in Figure 3.1. The purple boxes represent other chapters in this report, the blue represents the data collection phase, and green and yellow the data analysis.

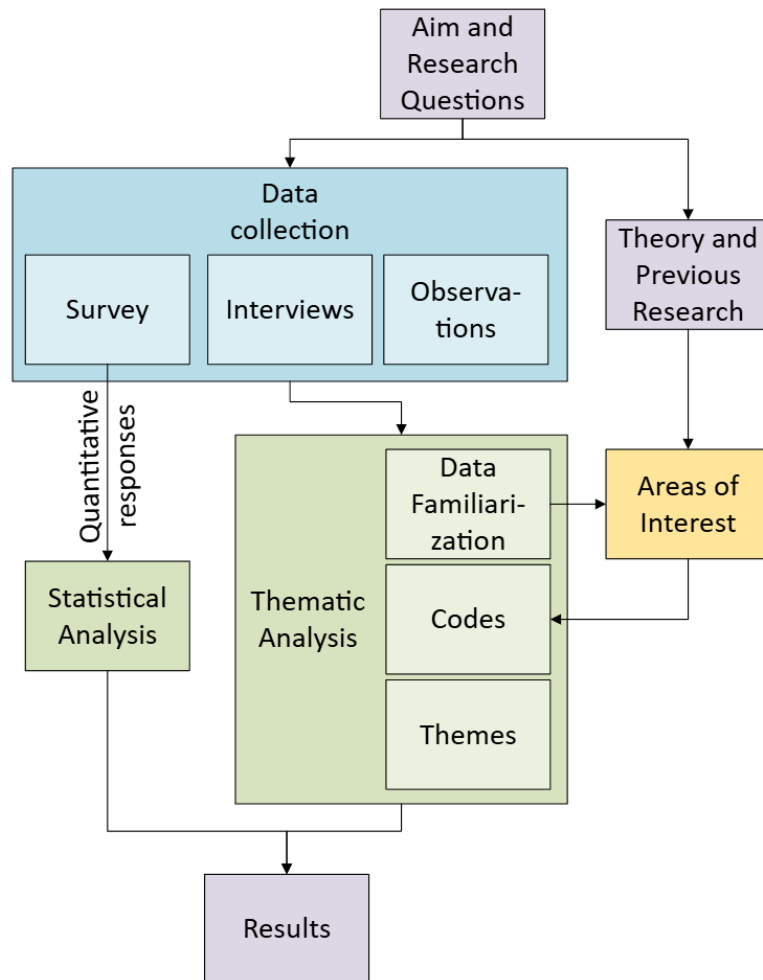


Figure 3.1: Overview of the method used. Blue is data collection, green and yellow is data analysis.

Starting off in the blue box, this report builds on three methods of data collection - interviews, a survey, and on-site observations - to compare the perspectives of both

guides and visitors. In a prior evaluation of a similar exhibition (“Do You Speak Quantum?”), introduced in Section 2.3.5) Decaroli and Malinowski (2022) recommended incorporating visitor feedback surveys in order to better measure exhibition impact. Moreover, they suggested that data such as the total time that a visitor spent interacting with the pieces and the scientific ambassadors could be collected and analyzed quantitatively. This was however not feasible in this case, and instead we hoped observations would help give insights into visitor behavior. Finally, semi-structured interviews were held to get a guide perspective and more in-depth answers.

Then, the responses from the quantitative survey questions were analyzed through descriptive statistics. The rest of the data, comprising a great majority of the results, was parsed using thematic analysis with an extra step (the yellow box in Figure 3.1) added in order to narrow down the focus of the study from the large amount of data collected. The inherent flexibility of thematic analysis suits the variety of data collected here.

3.1 Data Collection using Methodological Triangulation

As mentioned, three different means of data collection were used, enabling the use of triangulation. Triangulation is a way to get richer, fuller data (Wilson, 2014), as well as increasing objectivity and validity of a study’s findings (Fusch et al., 2018). The main principle of triangulation is using more than one particular approach in gathering data (Wilson, 2014). There are four types of triangulation each varying a different facet of the approach; the data, investigator, theory or methodology. Here, methodological triangulation was used: multiple data-collection methods were implemented to examine the same phenomenon to improve understanding and reduce the impact of each method’s individual weaknesses (Fusch et al., 2018). Observations captured specific behaviors displayed by both the guides and visitors. The interviews added depth by inquiring about thought processes and decision-making. The survey broadened reach across different target audiences and visitor groups.

3.1.1 Interviews

Answers from interviews with internal stakeholders, guides and teachers who have attended the *Amazing Journey* at least once served as the primary results for this study. Interviews provided more detailed and in-depth answers, making them useful to clarify the decision making behind tour tailoring and to illuminate the visitors’ experience.

To target similar topics in multiple interviews but still allow enough flexibility to capture a representative picture of the respondent’s view, the interviews were semi-structured (Esaiaasson et al., 2024). They were conducted using an interview template (see Appendix C) that was adapted to better fit the knowledge and relevant experience of the person being interviewed. Moreover, the semi-structured nature

allowed for variations in phrasing, order and follow-up questions to more naturally fit the conversations and the opinions expressed by the respondent. When designing the interview guide, we considered question order and followed the guidance of Esaiasson et al. (2024). We began with warm-up questions about the interviewee’s background, then moved to themed questions that addressed the study’s core topics while remaining broad enough not to steer responses. After respondents had expressed themselves freely, we used follow-up questions to probe specifics. For example, we first asked how guides adapt the tour for different target audiences, and only then asked about time management, group size, and related factors.

We interviewed AstraZeneca employees from internal communications, site management, the BioInnovationUnit (an external collaboration hub for small companies), the project lead for the Amazing Journey, and several highly experienced guides. The AstraZeneca interviewees, their general expertise, usual visitor group types, and interview language are listed in Table 3.2. The interview ID’s are labeled with an **I** for internal stakeholder, or **G** for experienced guides. Please note that the internal-stakeholder interviews served a double purpose as they are also experienced as guides. Additionally, interviews were held with four teachers who has arranged field trips to AstraZeneca for their students more than once. Their interview ID’s begin with **E** for educators/external parties. The education level and program they teach, as well as interview language, are listed in Table 3.1.

All interviews were recorded with Windows Sound recorder and transcribed using the Chalmers provided AI-tool for meeting transcriptions (using Claude 4.5 Haiku and Claude 4.5 Sonnet run on Amazon Bedrock), with consent from respondents. Subsequently, the transcriptions were manually checked and corrected to ensure accuracy of the quotes. After this, quotes were extracted and translated into english for the interviews held in Swedish. Interview language is listed in Table 3.2 and Table 3.1, indicating which quotes were translated from Swedish into English. After selection and translation of relevant quotes the interviewees got the opportunity to confirm that they felt the quotes were accurate.

When selecting interviewees from the three groups, we aimed for diversity so that perspectives would complement one another, reflecting the many purposes the *Amazing Journey* serves. Consequently, findings from interviews was considered valuable even when raised by only a single participant, as they can represent the perspective of a specific group. At the same time, themes that recurred across guides and visitor segments are especially important for informing decisions about the *Amazing Journey* and for broader applications.

Table 3.1: List of interviewed teachers for recurring visiting groups.

ID	Teacher at...	Interview language
E1	Folk high school natural science program	Swedish
E2	Upper-secondary natural science program	Swedish
E3	Upper-secondary natural science program	Swedish
E4	Master’s program in international business	English

Table 3.2: List of interviewed AstraZeneca internal stakeholders and experienced guides.

ID	Role or background	Usual group types	Interview language
I1	A founder of AJ	Mixed	Swedish
I2	Lead in strategic AJ changes	VIP delegates	Swedish
I3	Communications specialist	None	Swedish
I4	Pre-clinical science, and external partnerships	Company delegates and mixed	Swedish
G1	Chemist, Pharmaceutical Technology & Development	Students and mixed	Swedish
G2	Bio science, and Pharmaceutical Technology & Development	Mixed	Swedish
G3	Chemical engineering, IT, and external partnerships	Mixed	Swedish
G4	Chemical engineering, and early phase development	Mixed	Swedish
G5	Mathematical modeling on sustainable innovation	Mixed	Swedish
G6	Chemical engineering, and Pharmaceutical Technology & Development	Students and mixed	Swedish
G7	Chemical engineering, and medicinal chemistry	Mixed	English

3.1.2 Observations

Direct observations are a way of collecting data on one or several people’s actions through attentive scrutiny (Esaiasson et al., 2024). In our study, they were conducted to observe any gap between intention and execution in guide tailoring, and to observe visitor interaction. Guiding style and preferences are not always intentional or apparent to guides themselves; observing multiple guides could help to reveal patterns that may not have surfaced in interviews. Additionally, it also helped to generate targeted interview questions when guides were first observed and then interviewed. Consequently, the guide’s thoughts behind specific tailoring decisions could be asked about.

Moreover, the observations revealed whether, when, and how visitors chose to interact with the modules, guides, and with one another. Observations regarding interactions and engagement does not give the complete picture, since observations generally cannot accurately assess people’s emotional states or intentions (Esaiasson et al., 2024). To address this, a few predefined indicators (like laughter, discussion,

physical module interaction, and questions asked) were used along with the more free-form observations. Observation of this itself can still be misinterpreted, which is why a survey and interviews were also used to measure visitor experience.

Esaiasson et al. (2024) characterize observations by where they land on six different scales regarding their design. These six properties of design are:

- How passive or active the participation of the observer is in the situation.
- The length of contact, from short interactions to multiple observations done over months or years.
- If the observer intentionally steps in to manipulate and affect the situation being observed.
- How aware the participants being observed are of the details of the observation.
- How natural or artificial the environment in which the observation is carried out is.
- How standardized or open ended the actual data collection is.

In our case, the nature of observer participation leaned more towards passive. Although we listened and followed along with the tour the same way as visitors do, we did not ask questions about the content or similarly engage more actively. Moreover, we did not do any of the guiding, though we answered the visitors' questions if no guide was available, and sometimes helped to keep the group together during transition times. This also meant that the degree of manipulation was low. Similarly, the environment can be considered mostly natural as the observed tours take place on AstraZeneca's site like they normally do.

In this study, the length of our contact with the observed groups was limited to the individual tours (between 30–90 minutes), with occasional add-ons such as brief presentations or the extras described at the end of Appendix A. This short time frame implies limited opportunity to connect with and thus understand the visitors unique perspective, which is why a visitor survey and interviews with teachers were important to fully understand visitor perspective.

We consistently aimed to be transparent about the purpose of our observations. Before each tour, we obtained consent from both the guides and the primary visitor contact. The remaining participants were informed of the presence of observers at the beginning of the tour, including a brief explanation of why the visit is being studied. No personally identifying information was recorded during the tours. If any visitor had requested not to be included in the observation, that request would have been noted, and that person's questions and comments would not have been documented.

The observations were conducted in two phases. In both phases we used structured templates to guide note-taking, but they differed in openness. The first template covered many different topics, and though it was highly structured it also left room for general impressions (see Appendix B.1). The second phase, which focused on

investigating more on specific parts, began after the initial theme generation and was designed to extend the patterns already observed and to connect more explicitly to existing theory and prior research (see Appendix B.2). Accordingly, its template emphasized deeper and broader reflections on the topics: interaction, questions, discussion, and humor. In total, 15 observations were conducted with the first template and 8 with the second.

3.1.3 Visitor Survey

On one hand, the visitor survey was designed to add comments that support the qualitative findings. On the other hand, the ranking and rating of predetermined items provide a quantitative perspective of the visitors’ experience of the *Amazing Journey*. This complemented the interviews with group contacts by providing a larger volume of responses and a more direct view of individual opinions. Moreover, it was an important tool to capture visitor perspectives from audiences beyond students, since our visitor interviews were limited to teachers speaking on their students’ behalf.

In designing the survey (full template can be found in Appendix D), we considered both content and respondent encumbrance. The questionnaire was organized into two sections — practicalities and content — to capture the two main dimensions of the visitor experience and their take-home messages. We aimed to maximize gathered information while avoiding unnecessary or lengthy items, since excessive completion time reduces response rates (Esaiaasson et al., 2024). To further support participation, the survey was offered in both English and Swedish. Question order was also planned to minimize bias. Following recommendations from Esaiaasson et al. (2024), broad, open-ended questions were placed first so respondents could express their views freely, followed by rating and ranking items on predefined factors. This sequencing reduced the risk that listed options might prime or constrain free-text responses.

The survey link was distributed (through a QR code) at the end of the *Amazing Journey*, and visitors were encouraged to respond immediately, though those in a rush could scan and complete it later. The survey was anonymous, and only start and end times were stored to distinguish responses. The primary constraint on sample size and demographics was the number of visiting groups within the study’s time frame. The survey ran for approximately 11 weeks, and to account for this limited time, some additional visits were scheduled to boost responses. A second constraint concerned audience mix: for most VIP visits, AstraZeneca’s visitor coordinator judged it to be inappropriate to request survey participation, even if observations were sometimes permitted. This skewed the respondent pool to consist of mostly students, and reduced the diversity of business-audience responses. Finally, many of the very small groups and spontaneous tours not booked through the internal system were excluded for practical and anonymization reasons.

In total, 178 visitors completed the survey out of the estimated 399 people asked (people counted during observation or registered for the visit), which corresponds to a response rate of 44.6%. Though response rate depends on several factors and

what is counted as a good response rate can vary, this is comparable to the 44.1% average reported by Wu et al. (2022) for education-research online surveys. Moreover, it also lies within the 30-60% range noted as normal by Siegle (2024) for face-to-face surveys, and above the 30% they describe as high for online surveys.

For analysis, respondents were grouped into three segments to keep sample size workable; business (n=38; including AstraZeneca employees, company representatives, researchers inside and outside AstraZeneca's fields, and other stakeholder groups), university students (n=103), and upper-secondary students (n=37).

3.2 Data analysis

The data analysis was, as previously mentioned, done in two parts. Interviews, observations, and some of the survey questions were analyzed using thematic analysis, and the quantitative survey results were processed using descriptive statistics.

3.2.1 Thematic Analysis

Thematic Analysis (TA) was used to analyze the data, following Braun and Clarke's (2022) approach. TA is well suited to accommodate varied data types and volumes, which was vital given the mixed methods (interviews, survey, observations) used in this study. It also provided a clear, reflexive framework for rigorous qualitative work without requiring specialized software (Braun & Clarke, 2022). Moreover, TA helps move beyond description toward an interpretive account of patterns. Braun and Clarke (2022) describes TA as consisting of six phases: familiarization; coding; generating initial themes; developing and reviewing themes; refining, defining, and naming themes; and writing up.

The first step, familiarization, provided an overview of the collected data. Braun and Clarke (2022) emphasize that becoming closely acquainted with the material — here from interviews, survey responses, and observations — is a crucial preparatory stage to deeper analysis. For interviews, the familiarization consisted of manual corrections to the transcripts and an initial sift where clearly irrelevant content was removed and the remainder organized by research topics. For observations and free-text survey responses, familiarization was done through periodic read-throughs as the data was collected.

During this study, a large volume of data was generated, especially from the interviews. To keep the scope manageable, we added an extra step between TA phases 1 (familiarization) and 2 (coding) (see the yellow box in Figure 3.1). In this step, we defined areas of interest that would limit and guide subsequent coding. These areas were determined from: the research questions, major patterns observed during data collection, and the relevant theory and prior research.

The second phase, coding, aimed to identify and label any data segments relevant to the study aims and research questions (Braun & Clarke, 2022), in this study limited by the areas of interest. We systematically sorted the material, assigning

each meaningful fragment a code label that captured what it expressed. Although Braun and Clarke (2022) states that a single-coder approach is common, they also argue that multiple coders can yield a richer original code set, and we adopted the latter approach. Each researcher first coded one half of the dataset, then we swapped halves to review, refine, and extend one another's codes to still maintain consistency. The coding was done using *Taguette* for interview transcripts, Microsoft Excel for survey responses, and Microsoft word for observations.

Steps three to five concern generating and revising themes from the coded data (Braun & Clarke, 2022). In step three, generating initial themes, a first set of themes was constructed by looking for patterns and meanings across codes. Step four, developing and reviewing themes, is an iterative process that often involves major revisions to check each theme's fit, its relationships to other themes, and its alignment with existing theory. In this step, we returned to the full dataset to test whether the themes accurately captured the relevant patterns in relation to the study questions. This phase was done collaboratively in *Miro*, using digital sticky notes to group, split, and rearrange codes until the themes were defined and developed.

Step five was the refining, defining, and naming of themes that finalized the analysis. This phase would often consist of minor adjustments, assigning clear names, and writing concise descriptions of the ideas, patterns, or meanings each theme captures (Braun & Clarke, 2022). In our case, this was done mostly in tandem with phase six: writing up. Although listed last, Braun and Clarke (2022) note that writing typically runs in parallel to the entire process, especially once initial themes have been generated. The goal in writing up is to build a convincing narrative for the conclusions by using clear, concise arguments supported by well-chosen extracts from the dataset, here presented in the results.

3.2.2 Statistical Analysis of Survey

Descriptive statistics can be explained as the description and summarization of data through graphs or index values (Cooksey, 2020), and we used it to visualize and condense the large amount of data gathered from the survey. Specifically, we looked at response frequencies to compare between factors/themes and groups. For the statistical analysis, the survey items were grouped into four segments: free-text responses, overall impression ratings, ratings of tour-specific factors, and rankings of content areas.

For the free-text responses, we used them both in the thematic analysis and as material for quantitative analysis. The most common kinds of responses were grouped and summarized, as well as counted for frequency. If a comment contained more than one distinct idea, it was coded to each relevant category. To avoid double counting, multiple remarks from the same respondent on the same category were counted only once (even if written in separate questions). Next, the general-impression ratings were summarized using the mean and standard deviation. Moreover, the full response distribution for the general impressions was visualized in a bar chart (created in Microsoft Forms' automatic question summaries).

The chart of tour-specific factors was produced in Excel. First, the number of responses in each of the five categories; Crucial, Very important, Important, Somewhat important, and Not very important. Note that these categories are not centered around a neutral option since they were all selected because of presumed importance grounded in findings from both the literature search and discussions with people experienced with the *Amazing Journey*. Then, to compare audiences (business visitors, university students, and upper-secondary students), we calculated the percentage of each audience who rated a factor as Crucial or Very important and plotted the results in bar charts. For the content-area ranking, we applied a similar approach by counting first- and second-place rankings by group and reporting the percentage in each audience who ranked each content area among their top two.

4

Results

This chapter opens with a summary of the survey’s quantitative results and then presents the findings from the thematic analysis. The themes are presented in the order of the original research questions in Section 1.1, as shown in Figure 4.1.

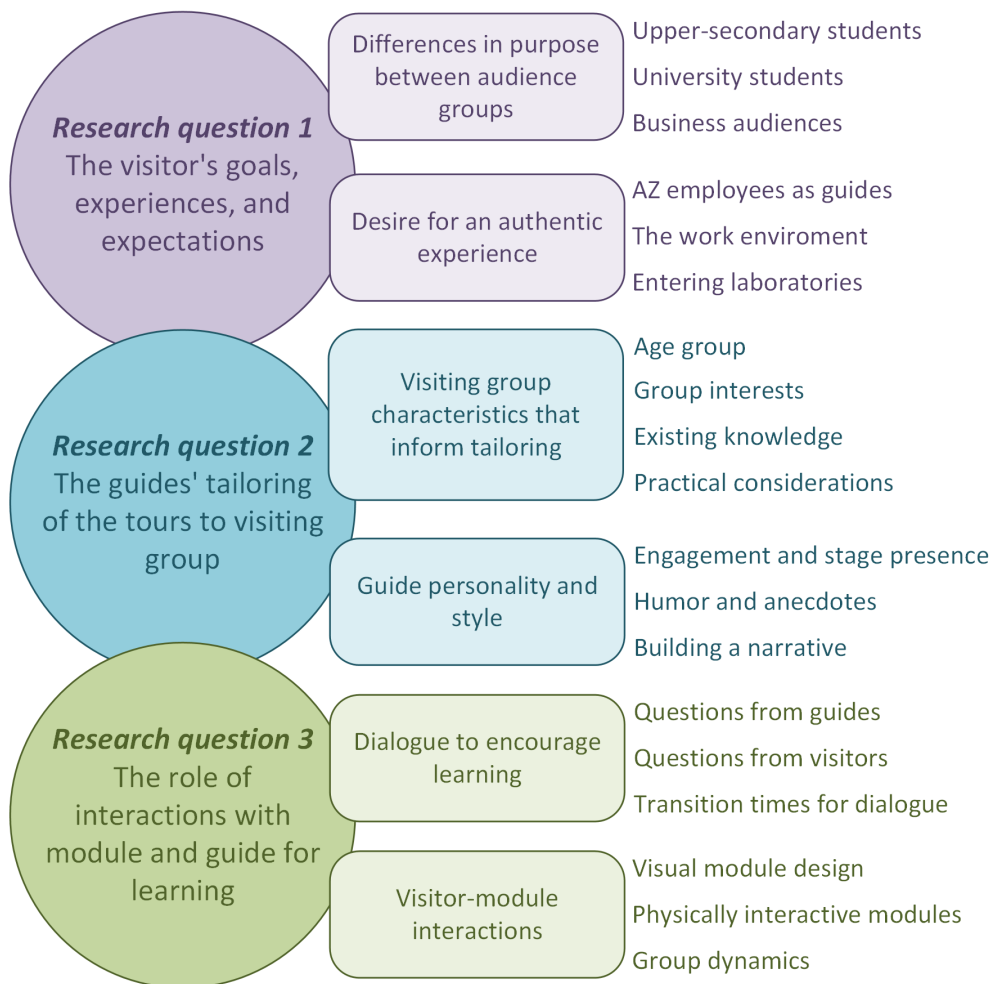


Figure 4.1: A structured overview of findings, mapping themes to each research question.

Throughout the chapter, visitors are segmented into three groups: upper-secondary students, university students, and business visitors. This segmentation was chosen

because it – to some extent – reflects difference in age and life experience, while still yielding segments of comparable sizes (see also Section 3.1.3).

Most quotations presented in this chapter were translated from Swedish into English to improve readability while preserving the original meaning. For interview languages, see Tables 3.1 and 3.2.

4.1 A Summary of the Visitor Survey

The general impressions of the *Amazing Journey* were to a great majority positive. The average rating across the 178 respondents is 5.04, with a standard deviation of 0.88. Figure 4.2 illustrates the distribution of the responses, with the bulk of ratings at Levels 5 and 6 and no responses at Level 1.

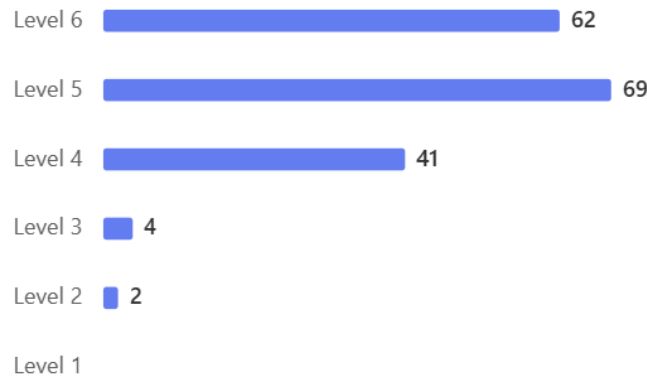


Figure 4.2: Distribution of tour ratings by level, showing the count of respondents at each rating level (Level 1–6).

As for tour execution, respondents were asked to rate the importance of several pre-defined factors for their experience. Figure 4.3 shows the distribution of responses, ordered by the percentage who judged each factor to be *crucial* or *very important*. Guide- and discussion-related elements were the highest rated, whereas group size and module-specific elements appear lower on the list. Note that the scale of these answers are not centered around a neutral option as the factors were selected because they were all expected to be of some importance to the experience. However, this provides a ranking of what visitors prioritized, highlighting interaction with the guide over module details and group size.

While Figure 4.3 shows the distribution for all the respondents, Figure 4.4 displays the share of each audience group who rated a factor as either *crucial* or *very important*. The two student groups showed broadly similar response patterns, but with university students placing slightly more value on small group size. Business visitors, more than students, emphasized the same interpersonal elements that dominate the overall results (guide delivery, guide knowledge, opportunities for questions) and gave comparatively less weight to module-specific features (see Figure 4.5).

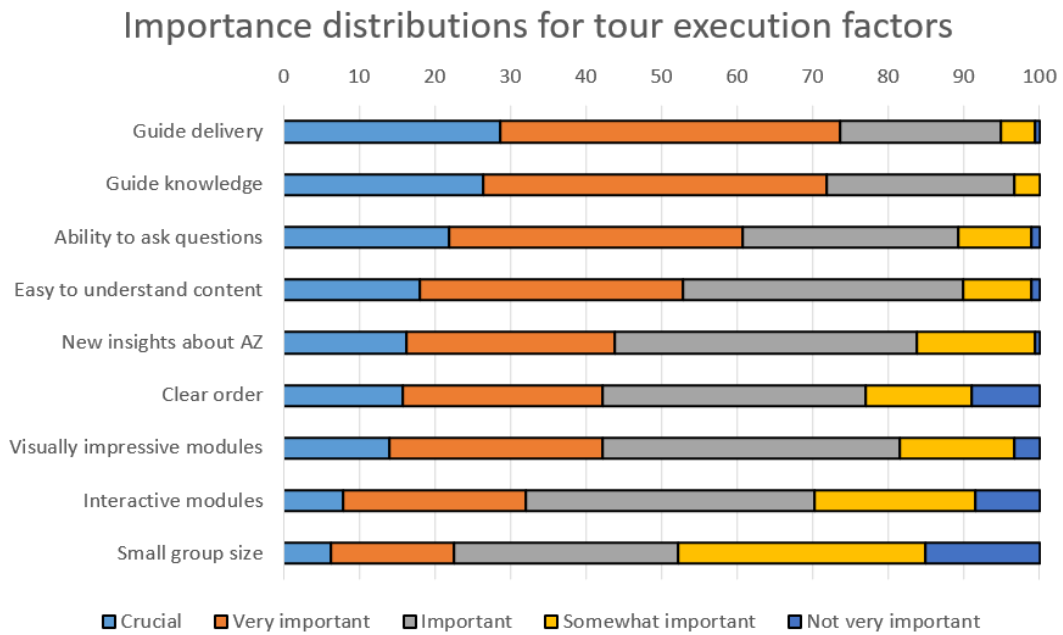


Figure 4.3: Stacked bar chart of percentage distributions of responses for the nine different tour-execution factors. Bars are ordered by the share of respondents rating each factor as either crucial or very important.

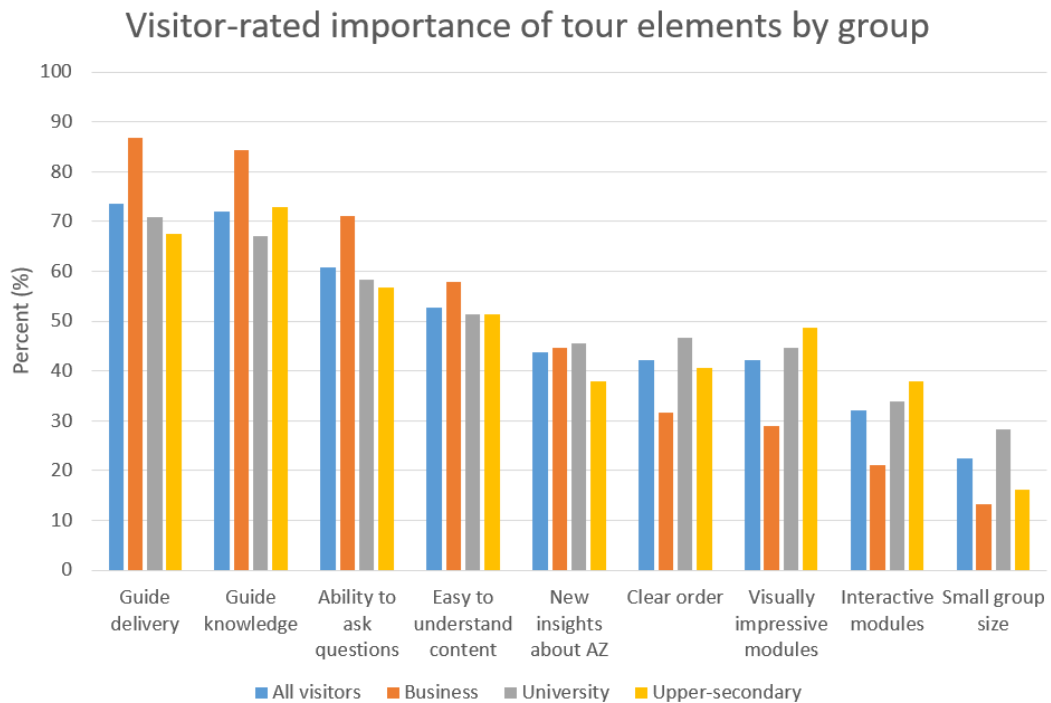


Figure 4.4: Bar chart comparing the percentage of respondents in each group who rated the nine tour-execution factors as either *crucial* or *very important*. Factors are ordered from highest to lowest overall importance.

For content priorities, Figure 4.5 shows the percentage of each group who ranked a theme as either most or second most important. Here, the guides from the interviews are also included to highlight contrasts with visitor preferences. Note that the sample size is small ($n=11$) and, as mentioned before, purposefully diverse, so those percentages may not be representative for guides in general.

First, two content themes stand out as highly ranked across all groups: “Facts about developed drugs and their use for patients” and “The research, technology, and science in use”. Second, each visitor group has one area where they show a distinctively larger interest compared to the overall average. Business visitors prioritize facts about developed drugs and patient use; university students are comparatively more interested in what it is like to work at AstraZeneca Gothenburg; and upper-secondary students show greater interest in the site’s history. Lastly, the major difference between the visitors’ and the guides’ rankings is the guides’ stronger emphasis on AstraZeneca’s vision and goals, alongside a comparatively lower emphasis on history.

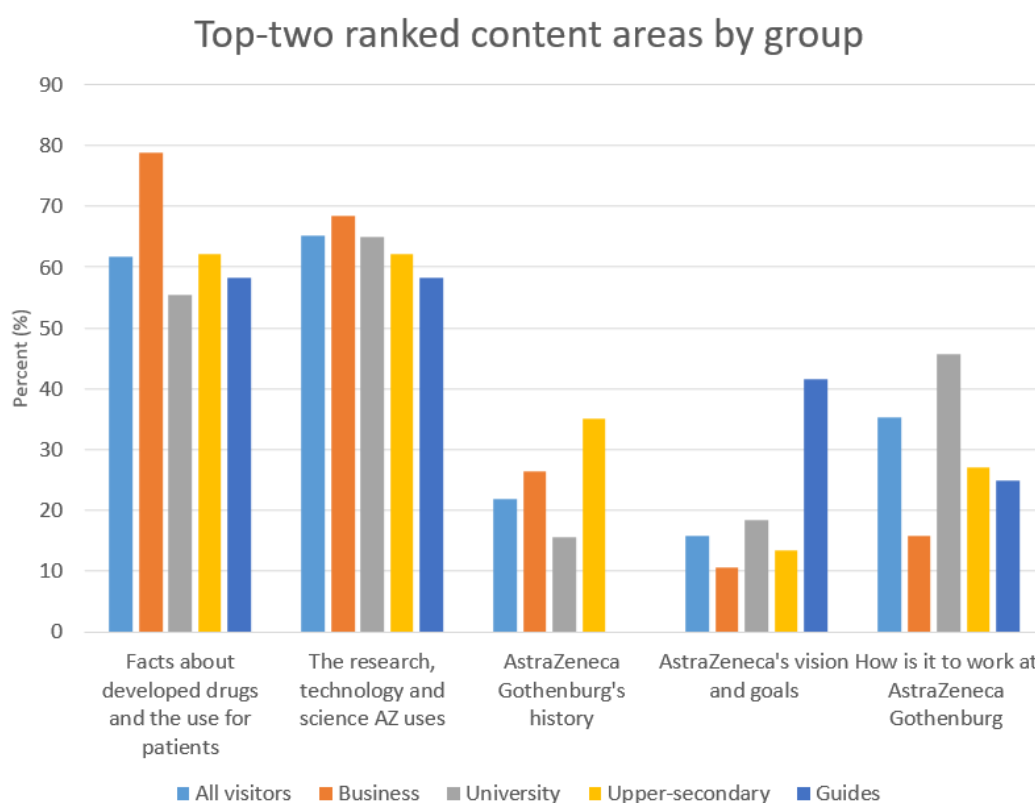


Figure 4.5: Bar chart comparing the percentage of respondents in each audience segment - including Guides - who placed each of five content themes in their top two priorities. (No guides, meaning 0%, ranked the historical factor as top 2).

The free-text responses were categorized and counted for frequency as described in the method. These frequencies are summarized in Table 4.1, organized by positive versus negative impact on the visitor experience. Additionally, 120 out of the 178

total respondents reported that the tour met or exceeded their expectations.

Table 4.1: Table of the most common free-text response categories and their frequencies.

Out of 178 total respondents	
Number of respondents	who reported that their experience was positively impacted by:
35	Guides' knowledge, friendliness, or delivery style
7	Guides' adjustments to delivery, pace, or content
35	Use of interactive or visually engaging elements
80	The tour being interesting, informative, or inspiring
Number of respondents	who reported that their experience was negatively impacted by:
14	Insufficient information about career opportunities
52	Too little exposure to ongoing scientific work
22	Not being able to see the laboratories
17	Too much standing
18	The tour being too long
8	Difficulty hearing or understanding the guides

These statistics complement the qualitative findings from the thematic analysis, which is presented in the next section.

4.2 Visitors' Goals, Experiences, and Expectations

This section presents results addressing research question 1: *What do visitors hope to gain from the visit, and what similarities and differences emerge across target audiences?* (see Figure 4.6). First, in Section 4.2.1, the purpose of a visit to the *Amazing Journey* for upper-secondary students, university students, and business audiences are investigated. Then, in Section 4.2.2, we further explore the general desire across visitors for an authentic experience. That section is divided into three parts: the guide as an employee, the work environment, and seeing the laboratories.

Below, we report perspectives on the visiting experience from frequent visiting teachers, from visitor survey responses, and our observations as this section mostly concerns the visitors. Though, because most guides had extensive experience with what different groups want, interviews with guides provided complementary insights that help complete the picture of the visiting experience. For example, guides helped address groups that were underrepresented in the survey for practical reasons, such as certain VIP and business visits.

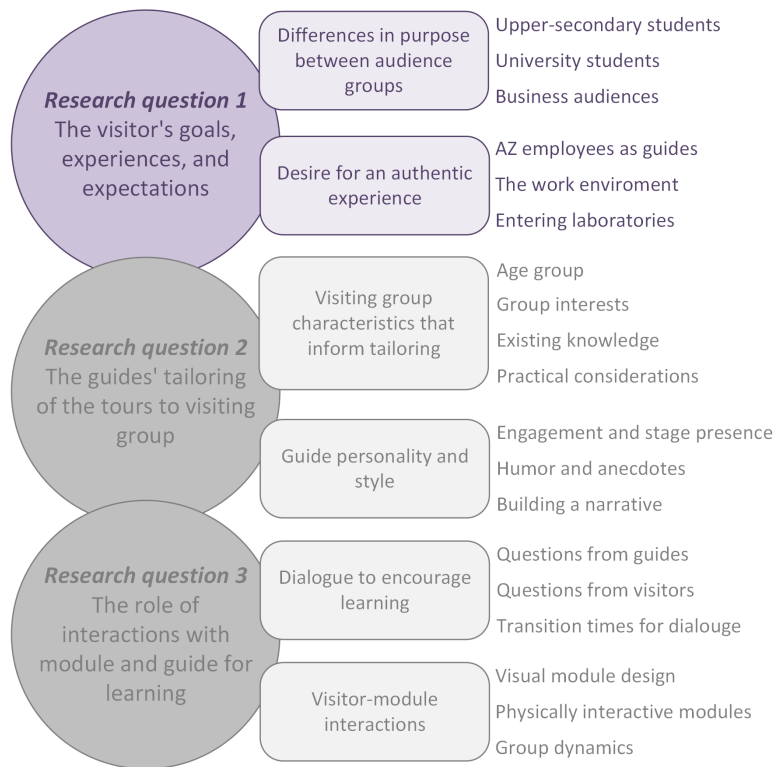


Figure 4.6: A structured overview of findings, mapping themes to each research question. Topics covered in this section are marked in purple.

4.2.1 Differences in Purpose Between Audience Groups

The purpose of the visit differs across target audiences. One guide explained that the *Amazing Journey* serves two purposes for the wide range of visitors:

“Partly it is for those who do not know so much about drug development and want [to learn more], where we can share, for example to students, a curiosity. . . . We also have a mission to open up and show how pharmaceutical research is conducted for – this could be politicians and already qualified physician who need to understand a little bit how this process is.” — G1

This quote offers a brief insight into the different target audiences, their varied prior knowledge, and the different purposes of their visits.

In the following subsections, we examine differences between an upper-secondary school field trip, a university field trip, and a business-purpose visit, focusing on four aspects: sparking interest in science, role modelling, attracting talent, and strengthening relations and collaborations.

4.2.1.1 Aims for Upper-Secondary Students

For upper-secondary teachers, the field trip’s purpose is to encourage to further study in science and to let students experience a potential workplace, rather than

requiring students to bring new learning back to class. Still, it is important that the visit connects to program or course content in some way:

“It is a bit about broadening one’s horizons above all. To show and point to the breadth of the scientific field, and AstraZeneca is gigantic in that way in that they involve so many other different types of occupational groups. We want to have something that is very strongly anchored in the courses they take. . . . [However, we do] not expect them to come home with new knowledge that they will apply during lesson time; rather, it is more about creating an interest, or maybe we got one or two to choose something that has more to do with that field in some way.” — E2

As the quote suggests, the purpose is to sow a seed of interest in science and possible study paths, rather than direct talent attraction.

We also observed a class from a folk high school’s science foundation year and interviewed their teacher, E1. Since this is a pre-university program, we group these students with the upper-secondary segment. Similar to the aims above, teacher E1 noted:

“The goal was to get an insight into how a workplace in chemistry works, . . . as an inspiration to see if that profession fits – to work with chemistry and pharmaceuticals. And also . . . to connect the teaching to something real as well.” — E1

What AstraZeneca aims to highlight in upper-secondary visits is the breadth of professions and competencies needed – that there are many paths into the site – according to guides (G2, G4, G6) and what the guides said in our observations. This helps keep interest high across the whole group and supports informed education choices, recognizing that not everyone in upper-secondary school wants to become a chemist. As one guide put it:

“There are so many paths in. You can be so many different things to work here. You can be a chemist and a biologist and a physician and a nurse or a statistician, a mathematician” — G2

Turning to guides as role models in STEM, their passion is crucial for sparking interest in these education paths. When asked what makes being guided by AstraZeneca researchers special, one guide emphasized the importance of helping students see themselves in those roles:

“‘You know, you could be in my spot in a few years, no problem’-so you giving [sic] that inspiration and so on. . . . I have had so many [sic] feedback hearing that is like ‘it is good to hear people that are passionate about their jobs’.” — G7

4.2.1.2 Aims for University Students

We found that universities organized field trips so students could experience a potential employer’s work environment while also linking the visit to course content. An

innovation management professor (E4) emphasized that the visit must connect theory to observation to be valuable. They described how the tour content connected to their specific course content:

“What I want them to do is always have some connection between theory and what they observe. So, for example, what I personally find interesting is . . . this circle that shows how the innovation process works over 10–12 years [see Figure A.19]. . . . So there are different steps from starting an innovation project to actually bringing a pharmaceutical product to the market—how long it takes and how difficult it is. I think this is what’s most interesting for me, and maybe even for business students.”

— E4

From a student’s perspective experiencing a potential employer, and getting in-depth knowledge about the company and their techniques is highly valued. In the survey, visitor V129 responded:

“As a third year bachelor student in biomedicine I would have appreciated more in depth knowledge about different techniques used and the pipeline from hit identification to finalized product as well as potential career opportunities at AstraZeneca as a bachelor, master etc.” — V129

We found that AstraZeneca aims to strengthen relationships with academia and universities, both nationally and internationally. Equally, AstraZeneca’s purpose in hosting university students near the end of their studies was to showcase the site as a great place to work and attract talent to industry careers. From our observations, the target audience spanned programs from pharmacy to engineering to business management. Talent attraction and highlighting AstraZeneca as “A Great Place to Work” received slightly more emphasis with university students than with upper-secondary students, since they aligned more directly with AstraZeneca’s hiring profiles. As one guide explained:

“For pharmacy students . . . these therapy areas that . . . position us as a sort of future employer and illustrate what we work with. . . . AstraZeneca’s vision and what it is like to work here—more like that; career focus, whereas for the upper-secondary students it may be a bit more science focus or inspiration.” — G5

Guides as mediators in research were also important for university students, who may go on to pursue a PhD or move directly into industry work. Professor E4 pointed to the value of experienced guides to inspire this audience:

“It should be someone who knows the company well - ideally has been working there a few years - knows the background and stories and has a broad perspective. . . . The person should have a mandate to say something that is beyond the script.” — E4

At the same time, we found that involving newly graduated employees as guides enhanced proximity and relatability for students, which also were inspiring. As experienced guide G7 put it:

“I’m super glad we have [graduates] guiding. This is really, really cool because it brings even more proximity to [the guides] – we have lots of students coming in. It’s like, ‘hey, I’m there, so can you.’” — G7

4.2.1.3 Aims for Business Audiences

In business settings, the purpose of the *Amazing Journey* was to introduce the site, the company, and its areas of operation, and to convey that “something exciting is going on here” (I4). This had the aim of enabling collaboration and strengthening relationships. After the introduction, visiting parties typically moved to a meeting room to discuss or deepen the visit’s focus. One guide and internal stakeholder reflected that for these visitors, it was especially appreciated:

“To get this more well-thought-out route, where you actually cover some things that are a bit exciting to listen to. I think that is very much appreciated, ... [to] get to experience the site at the same time. ” — I4

We noted that AstraZeneca seeks to open up and show what is done on the site to a wide range of groups within the business sphere. An internal stakeholder and experience guide in the business sphere (I2) described three main categories:

- **Corporate-affairs oriented visits:** authorities, politicians, and external relations; also visits from industry organizations and trade unions.
- **Industry peers:** visitors from other pharmaceutical companies who come to see, for example, how AstraZeneca share lab facilities and knowledge (e.g., through the BioVentureHub).
- **Internal visits:** AstraZeneca’s commercial/marketing organization, visitors from other sites, and management teams – an important part of the visit portfolio.

According to internal stakeholder I2, corporate-affairs oriented visits started from what AstraZeneca wanted to achieve, rather than only considering visitor wishes. For example, the research side of the company were emphasized for a VIP delegation of high-ranking officials. We found that such corporate-affairs oriented visits also could involve trade unions, to inform them about the industry so they can advocate for AstraZeneca’s issues.

For visits from industry peers, specific parts were used rather than the general *Amazing Journey*; the focus was on what AstraZeneca did, why, and how practices had changed, not on explaining how the industry works – knowledge these visitors already had. Similarly, internal visitors were interested in how this site operates, rather than in basic industry overview. In several visits, we observed that colleagues from other AstraZeneca sites contributed with additional insights and helped guides clarify factual details.

4.2.2 Desire for an Authentic Experience

Continuing with visitors' goals, experiences, and expectations, survey responses and teacher interviews showed that many came to AstraZeneca Gothenburg seeking an authentic experience, which was a key reason for visiting and also shaped their take-home messages. Overall, visitors reported being very pleased and grateful for the tour and the guides; as their interest and inspiration grew, so did their desire to know and understand more. Below we separated visitors' view on the guides, experiencing the workplace, and their wish to enter the labs to highlight their desire for an authentic experience.

4.2.2.1 AstraZeneca Employees as Guides

In figure 4.3, the guides' delivery and knowledge was the two factors ranked most frequently with 'crucial' or 'very important', with 73.6% and 71.9% respectively, by the visitors.

Our observations also indicated that the guide's delivery was a key factor in how engaged and interested the audience became, and the guide knowledge was important give new insights and to answer audience questions in a way that satisfied them, on their level. In the survey, three visitors put it:

"The scientist who guided the tour was very enthusiastic and engaging, which made the visit highly informative." — V61

"It was a well-guided tour and a lot of AstraZeneca's history and fun facts, which made the experience wonderful." — V131

"Very knowledgeable and engaged guide" — V27

This section focuses mainly on competence (guide delivery is discussed further in Section 4.3.2). Regarding the guide competence, the teachers stressed that it was an important part to make the visit a memorable and an interesting experience. When asked whether the guides had suitable competence and background for their group, teacher E1 said:

"Yes, they did have that. It was good that there was a guide who was more, like, into ...that they came from different phases of drug development." — E1

When asked hypothetically whether a guide should be an AstraZeneca employee or could be replaced by a robot, guide G1 underscored the value of employees' cross-functional experience and their knowledge of the company's history and anecdotes from many years on the site:

"I have good experience both in early and late [phase drug development]. ...I think that the difference between me and a robot is that I have a history because I have been here a long time. And I have good insight into many things." — G1

Several guides (G1, G2, G3, G6, I2) also noted that personal experience should frame the narrative, helping visitors connect emotionally with the guide and content, further enabling the visitors to become inspired. When guide G2 was asked whether a module was needed to talk about “what it’s like to work at AstraZeneca”, they answered:

“It is you as a guide, I think, who shows, ‘yes, I work at AstraZeneca. This is me. This is my journey. This is what I have gotten to experience’. . . I think that it becomes so anonymous if I don’t tell from the beginning who I am and what my story is.” — G2

On the other side, guide G4 preferred to keep their own experience brief, and instead focused on the site’s story:

“I usually do not talk that much about what background I have, . . . instead I talk more about what we work on in general at the company. Then it tends to come up that some are interested in: ‘well, what do you do,’ or ‘what is your background’, ‘have you studied here?’ . . . It is usually upper-secondary students who ask that kind of thing, and university students also ask such questions.” — G4

This showed that students were keen to hear the employee’s personal journey and how they got to where they were. If guides – like guide G4 – do not share much about themselves, their background, or their current work, they tend to be asked about it. Based on our observations, questions about the guide offered a low-threshold entry point compared to questions about advanced research or technology. A guide’s career story was closer to students’ interests and easier to relate to than technical details, and when guides shared their journey, they became role models for visitors.

To confirm that visitors wanted to meet AstraZeneca employees and hear their stories, three university students commented that they wanted:

“More insight into working at AstraZeneca.” — V117

“Maybe more personal experiences from the guides or the staff working at AZ.” — V127

“It would have been fun to meet employees within different areas and hear their experiences of AZ.” — V120

While most guides stressed the importance of accurate, and up-to-date information, guides G6 and G1 in particular spoke about the need to feel fully confident in the claims they presented. In our observations, this mainly arose when the company wished to highlight achievements that some guides did not feel entirely comfortable talking about, partly because they did not feel that they had sufficient knowledge of the subject. This in turn meant that they might more often skip over or only briefly mention the parts where they felt less confident. Guide G6, for example, mentioned that modules where the visitors might have questions they felt unsure how to answer might be skipped because the script provided insufficient support to bridge their gap in knowledge. In summary, in order to support the guides in providing an authentic

picture, it is important that the script and modules are up-to-date and provide adequate background and information.

4.2.2.2 Experiencing the Work Environment

The tour route begins at the main entrance, and slowly moves further towards the site's center, where spaces are more interconnected and employees move between meetings. This gave visitors a glimpse of the workplace – seeing people pass by, grab coffee, and collaborate – and conveyed the everyday environment of those working here.

A visitor from the audience 'company representative' commented in the survey:

“I really like that the exhibition is integrated into the building, which gives a feeling of that this is actually where research happens, which AstraZeneca wants to share with interested people.” — V45

The teachers (E1, E2, E3) explained what they thought their students would remember regarding the site:

“It looks so fresh and fancy at AstraZeneca, and you sit down and have meetings over a cup of coffee and you sit and work and connect in the café, and everything seems very far from a school.” — E3

The internal stakeholders and experienced guides (I3, I4, G6) also explained the impact of entering the site and how it felt to be inside:

“Going through the whole thing and seeing ‘there people sit and work’ and ‘there they go into the lab’ and so on. One should probably not underestimate that either. ...I think it gives a sense of what kind of operation we have, ...that it is a cool workplace.” — I3

Although visitors appreciated being close to people working and moving through the space, workplace sounds and movement could sometimes distract from the guide – for example, doors opening, elevator chimes, reception gates, phone calls, clacking shoes, rolling bags, or cleaning carts. When asked about disturbances during the on-site tour, teacher E2 noted a colleague who found the surroundings distracting, but instead offered a different view:

“He thought that ... [with] lots of staff passing by there and so on, he experienced that as distracting. I did not, so it can be a bit different how one experiences it. I think that it creates a bit more life in itself. ..., you are there to see how it is a bit more. Then you do not want to sit in a lecture hall - it is a guided tour.” — E2

Finally, in Table 4.1, the most common “missing” element noted in the survey (53 respondents) was a wish to see and learn more about the science and day-to-day work on site. Many also acknowledged the constraints of confidentiality, and understood that.

“I would like to have gotten more information about the research process, but understandable if it does not work with confidentiality.” — V28

“Would have expected to see more real work being done, to see what departments do instead of just hearing or reading about it.” — V29

“The opportunity to see the actual workplace so that one can see how the work goes on from day to day. It then becomes more graspable than a single exhibition; that usually makes it possible to ask more questions and become more interested.” — V105

4.2.2.3 Visitors’ Desire to Enter Laboratories

Turning to on-site experiences, because universities organize field trips to let students see a potential employer’s work environment, access to the lab was an important part of the visit. The teachers (E1, E2, E3) underscored that:

“It is very important . . . that one gets the opportunity to at least go into some corridor and look in when they are doing lab work. So that one doesn’t miss . . . that something is going on.” — E3

“Last year we got to come into the lab, and that made the students get a completely different sense of what everyday life was like at the workplace. . . . They think that someone who works with chemistry and drug development is in a lab a lot, and that is what you want to see as well, perhaps also it is where the passion for the whole thing should be.” — E1

The chemist guide G7 explained:

“If I can, I go to the [cell lab viewing corridor]. That happens very rarely, but . . . they like seeing that lab somehow. It works nicely. People are like; ‘oh, that’s an actual lab.’ . . . It’s not just a video of us showing you this. It’s an actual lab where people are working, and I think they really like that.” — G7

In the survey, the absence of seeing or experiencing a lab was the one thing highlighted the most when evaluating what the visitors missed or would like more of. 53 responses indicated that visitors wanted to see more science and learn more, and 22 of them explicitly mentioned the tour’s absence of experiencing the labs. Visitor comments on their desire to enter the labs:

“Would liked to see inside a laboratory to gain a deeper understanding.” — V94

“Would been interesting to also see the inside of the laboratory” — V91

More generally, when asked in the survey if the content matched their expectations, one visitor answered:

“Mostly, would have expected to see more real work being done, to see what departments do instead of just hearing or reading about it” — V29

This is one among 10 notes that they would have liked to know more about the

science, and see more of the daily work. This highlighted the importance of an authentic experience.

On an ending note, another guide perspective on visiting the labs was provided by guide G1:

“Before we used to take people out into the lab and that is by far best. We do that sometimes I can say, It gives so much more, but it also takes more resources. Instead, I think the films are very good. . . . That is the best we can do, I believe. I think it is better to do that than to . . . look in [inside] an empty fume hood. That does not contribute very much I think. Because then I think the films are actually better.” — G1

Even though the films from the labs were not enough for some, and were used to different extents by the interviewed guides – they are much easier and the less resource-demanding option compared to bringing a class inside a lab.

4.3 Guide Tailoring to the Visiting Group



Figure 4.7: A structured overview of findings, mapping themes to each research question. Topics covered in this section are marked in blue.

This section presents resulting themes that address research question 2: *How do guides at AstraZeneca tailor their tours to different visiting groups?* (see Figure 4.7). Specifically, Section 4.3.1 considers which group characteristics and situational

factors guides cite when deciding how to tailor a tour. For each categorization, some common changes and adaptations were provided. Moreover, Section 4.3.2 discusses themes of the guides' personal styles and methods for connecting with the audience.

4.3.1 Visiting Group Characteristics for Tailoring

When the interviewed guides described their thought process in tailoring tours to different visiting groups, they touched on several factors influencing their decisions and the various ways the tour is adapted. In this section, the underlying motivations for the adaptations have been categorized into the categories; age group, group interest, existing knowledge, and practical considerations. There may be some overlap between the categories in the quotes, since multiple factors can be considered at once. For example, age group and prior knowledge often correlate. However, each category still has distinct adjustments to the tour associated with them.

One theme that recurred across characteristics was that dialogue between the guide and visitors were essential for effectively tailoring the tour to visitors' wants and needs (see Section 4.2.1). This was expressed by both visiting teachers and guides. From a teacher perspective:

“I think, it's important that, before the visit, the guide knows a little bit what type of group is coming, . . . that the guide knows a little bit in which direction he or she should talk” — E4

Guides G3 and G7 also asked visitors directly:

“I simply ask them, 'What do *you* [emphasis added] want?'" — G3

They also took additional direction from other interactions, like the kinds of questions that arose during the tour:

“It's good to have groups who are actually asking [questions]. A group once I said, 'OK, I don't understand this thing, do you mind [explaining it]?', and I'm like, 'OK, now I get it.'" — G7

How this clarification informed adaptations, and what changes it can lead to, are elaborated on in the following sections.

4.3.1.1 Tailoring to Age Group

Multiple interviewees mentioned the age of the visiting group (broadly separated into youth and adults) as important when deciding which segments to include. For younger visitors, guides tended to favor interactive, engaging modules, and placed less emphasis on historical and business aspects, which tended to interest older visitors more.

When discussing student groups, guide G2 highlighted that they focused on the fun, visually impressive and interactive parts of the tour. Something that is also supported by guide G5's statement:

“Because I think that it appeals more to the [students], being more interesting, more interactive.” — G5

That guides leaned more on the interactive elements for younger audiences is partly supported by the observations. Most physically interactive elements were included for nearly all student groups, though not exclusively for them. For older groups, we observed that the guides gauged the suitability more dependent on the shown interest of the group. For example, when guiding a VIP corporate-affairs group, the guide explained how an interactive module worked and noted it was often used for younger students, but left it up to the visitors to take initiative if they wanted to try it for themselves. Similar observations were also made for an engineering leisure association and a group of healthcare professionals, where the participants themselves chose to engage and interact with the modules.

The reasons guides gave for this difference largely came down to life experience. Guide G2 suggests that they use the “straws” activity in module 3 (see Figure A.10), which simulated what living with chronic obstructive pulmonary disease (COPD) is like, with students because:

“It gives an ‘aha!’ experience, you get to feel something. ... It probably becomes more of an ‘aha!’ experience for school students. But then, ... sometimes you do get adults who have no connection to health care or any knowledge about this field of work, and then it can also be an ‘aha!’ experience to do one of those.” — G2

The value of actually getting to experience something was also mentioned by guide I3. However, the second part of guide G2’s quote suggested that previous experience is also something that this was related to how much of an impact it might have. This point was also raised by guide I1, and connects to guide G4’s example of how the interactive game where one competes against the HTS robot landed differently for different audiences:

“I believe that young people think the button machine is fun. A bit of an older target audience maybe thinks that ‘What’s the point? I understand that an AI computer is faster than a human.’” — G4

Regarding student groups and interactivity, the upper-secondary teachers in most cases stated that the interactivity was important, and sometimes that it could even be more interactive (E1, E2).

“But what the [students] think, is that it is maybe too much of just walking and listening, they would want to do something more interactive.”
— E2

However, older target audiences also appreciated interactivity. This was noted in the survey by a company representative when asked what they liked about the tour:

“It was noticeable that the guides had adapted the tour to the target audience. And, in addition, that they interacted with us visitors and tried to involve us.” — V51

Another point mentioned specifically in relation to younger students, partly tied to interactivity, was the need for breaks. Similar to what was mentioned by teacher E2 above, breaks were included to combat listening and physical fatigue. Guide G6 explained that they often used the films in module 5 as a way to listen to someone other than the guide, and to give the students a moment to sit down on the floor and rest. Teacher E1 also agreed that a varied delivery (something that is discussed in Section 4.3.2) and pauses were the key to keep the students alert.

“It helps quite a lot when one pauses and presses on something or does something [like that]. That makes the concentration stay up a bit more as well, when something happens. They have difficulty taking in too much of the same type of information, so they need to vary it.” — E1

As mentioned in the previous section, the specific content included also varied for different age groups. Guide G2 explained that they avoided spending too much time on patents and history for younger audiences. Likewise, guide G6 explained that:

“It is a bit more a whole-picture perspective on the brand AstraZeneca if one is going to run [the tour] for older people in some way. ... I might also add more about prices and [the economy of the site] too. ... It is such things that usually catches attention.” — G6

4.3.1.2 Tailoring to Group Interests

Areas of interest varied a lot across groups, tying back to how the different groups hoped to gain different things from the tour (see Section 4.2.1). In this section, the focus is on the specific content included, and the guides may choose to focus on or brush past various parts of the tour. In this section, the focus is on the specific content included, and guides may choose to emphasize or skim different parts of the tour. Add-ons can also be used to meet requests that fall beyond the modules’ original scope. To do so effectively, the guide had to first understand what interests the group.

As before, dialogue was key, but for this point specifically, many of the guides described how they try to read the group in different ways. Internal stakeholder and guide I1 stated that:

“You notice quite soon what they are interested in, and then I in some way try to just go in that direction in some way in what I talk about.”
— I1

Guide G4 and G1 expressed similar views about making in-the-moment adjustments. In addition, both guide G2 and G7 tried to actively build on the questions from the audience.

“We have a script with everything ... Well, then I pick out what is relevant for them and also build as we go, but what questions do they contribute with? And maybe then you don’t at all do what you planned, but you focus on what they are interested in instead.” — G2

Once the guide had discerned what interested the group, they could start tailoring the tour accordingly – for example, choosing the film on AI (Artificial Intelligence) for exchange students interested in engineering and coding. Another example of content adaptation was how guide G1, when guiding a group of process engineers, focused:

“A bit more on [the production process, including] . . . what happens in Södertälje, manufacturing and those parts.” — G1

In addition to the visitor’s wants, AstraZeneca’s perspective could also have influenced the content. This became especially clear for the business related visits and VIPs. For example:

“[A european country’s] ambassador was here for a health fair and wanted to visit us. [They] had some of [their] own wishes and knowledge. [That country’s] marketing manager could contribute with the knowledge that; ‘Yes, well right now [that] government is kind of eating at an active patent and is not upholding it. That you may gladly press on.’ So then I asked him to make sure to send some key messages and some numbers.” — I2

Specific add-ons, such as viewing corridors or niche presentations, were also used for some visits. For example, an upper-secondary class in production technology was shown the manufacturing display corridor with manufacturing equipment. This group, like many student groups that travel far, had scheduled multiple visits the same day. The interviewed teachers acknowledged that this often leaves students tired and unfocused, which negatively affected their perception of the tour. In this case, the add-on then proved counterproductive: eight of 15 students reported that the tour felt too long and that the extra segment was too much. Several visitors also noted that the content was too advanced for their level, causing them to lose focus.

“When it got a bit too niche with various machines and stuff, you lost focus.” — V81

Meanwhile, during a tour with university students from a math-related organization, the guides in chemistry and computational science were asked to tailor the content toward mathematics and statistics, which is an approach not commonly used and can be regarded as a specific add-on to this tour. As evidence of its success, one student commented in the survey:

“I thought it was very fun that the guides went in on a slightly deeper level and talked about how certain things work technically and mathematically.” — V71

Based on our observations and several survey responses, technically inclined visitors appreciated being paired with technically skilled guides. In that regard, the potential choice of guide can become an important tailoring factor to meet the interests of the group.

4.3.1.3 Tailoring to Existing Knowledge

Existing knowledge was often a complex topic since it could vary significantly even within a group. It encompassed several kinds of knowledge; historical, pharmaceutical, technical, AstraZeneca-specific, and more. Accordingly, we saw a significant focus on level and language adjustments.

Regarding the use of dialogue to make relevant adjustments, guide G1 and G2 preferred asking outright:

“That you can also ask when you start the guiding. What perception they have or how much they know, and then you can build that in.” — G2

Others chose to estimate a base level and then made adjustments depending on audience reactions, like guide G4.

“I have to put it at [one] level, and then I try to read how they react a little bit. And I usually ask like ‘is it a good level? Is it too high? Is it too low?’ ... So that it does not become that I talk over their head, or that I talk down to them” — G4

Having established or guessed at the group’s general level of expertise, the guide could start to make adjustments. Internal stakeholder and guide I4 described it as:

“If you have a school class here who maybe is in upper-secondary school and have not at all worked with [pharmacology], ... who not at all is at home with the vocabulary. You must adapt both language, what you even choose [to include], how you convey the message and in what way.” — I4

Internal stakeholder I1 expressed similar thoughts in adjusting their vocabulary, and guide G4 about making level adjustments to the technical aspects to meet the visitors where they are. From the visitor perspective, one teacher mentions that this might have been a difficult balancing act for the guides, and yet teacher E2 noted:

“[The guides] have not talked over [the students’] heads a lot; I think that they have set the bar at about the right level.” — E2

A survey response from a university student elaborated:

“It was very interesting, gave a good level of detail tailored to the participants’ understanding.” — V42

This suggested that the guide’s judgment of the group’s prior knowledge was sufficient to calibrate the level of detail and adjust their approach accordingly.

4.3.1.4 Tailoring Due to Practical Considerations

Many guides also highlighted the practical adjustments and logistical difficulties of the tours. Time adjustments, crowdedness, and disturbances from other workers were among the most frequently mentioned factors that need to be accounted for.

Time varied drastically with some guides mentioning that they sometimes did sections of the *Amazing Journey* in 30 or 40 minutes, but if you want the full tour; 90 minutes is a very reasonable time span. Guide G7 said:

“You adapt, because sometimes people won’t be there for long. So you, for me, I show the highlights. There are some things I’m gonna skip completely.” — G7

Many guides were observed making on-the-fly adjustments in content dependent on how long previous sections had taken. Mostly, this consisted of ending the tour early but mentioning some content from later modules at the stops they had time for. Especially for groups who showed great interest and asked many questions, each stop could run long. Guide G5 noted that:

“If we are talking about improvement potentials, then it is often far too little time.” — G5

In addition to time, space was a limiting factor. When asked about optimal group size, there were some personal preferences, but almost everyone agreed that 20-30 people was as many as reasonably accommodated. Guide G4 explained:

“The problem when there are too many [visitors] is that the stations where you stop can get a bit cramped then. Maybe not everyone can see; not everyone can stand at the front.” — G4

Moreover, some guides explained that they tried to adapt to reduce disturbances. This also related back to Section 4.2.2 about the desire for an authentic experience of the work environment, but how external disturbances might negatively affect the experience. Guide G4 gave an example of an adaptation: instead of stopping at the sustainability wall just outside a common area, they:

“Stopped down by the [sustainability] displays. ... It felt like that one it is a bit more out of the way from people, because there you don’t also stand in the corridor.” — G4

Larger groups more often had to shift to let other workers pass. Accordingly, when scheduling a tour, timing was planned to avoid high-traffic periods, such as lunchtime – especially for larger groups. Standing far from the guide or crowds walking past could also contribute to difficulty hearing the guides, something noted in several observations and a few survey answers.

4.3.2 Guide Personality and Style

When examining the combined rating of suggested factors, guide delivery ranked the highest, suggesting that the guides stage presence and how they actually presented the information were valued by the visitors. This section covers the more general engagement and presence, the more specific use of humor and anecdotes, and finally how the modules could be fitted together to tell a story.

4.3.2.1 Guide Engagement and Stage Presence

The guides' engagement and stage presence were something that could affect the visitor experience; they were mentioned as positives by several people in the visitor survey. For example, some visitors said:

“Passionate guide with interesting insights” — V18

“The hosts were very passionate and enthusiastic about what they were doing. That made the tour very fun.” — V43

“Very friendly and approachable guides” — V34

Additionally, teacher E1 mentioned that a passion for the science really shone through and improved the experience.

“That was really clear last year, she who guided us then, she really had a passion for doing lab work and chemistry and all that. You noticed that when she was in the [dark] room, that she knew a lot and thought that it was very fun to be in there.” — E1

When speaking to the guides, some also mentioned that showing their passion for their work was something they also consider important. As stated by internal stakeholder and guide I4 when discussing whether they mentioned what it is like to work at AstraZeneca, the passion for their work was often something shown, not told. I4 said that it is:

“Not something I say, but maybe I convey it indirectly. If it sounds like I am very passionate about what I do.” — I4

That passion showed was also mentioned by guide G7. Moreover, G7 emphasized that, for them, entertainment and imbuing this sense of passion were more important than having visitors remember all the specifics of the information on the tour:

“Because it's a lot of information for them, that's why I try to make it as entertaining as I can. ... If they remember 10% of it, I'm very happy with that. Or if [they] just remember it's good to see people passionate about what they do.” — G7

Additionally, guide G6 described how they intentionally tried to show their pride in the company's work and reputation by using dramatic language – using it to express passion, entertain, and create an impactful experience rather than just listing facts.

“We are cool. We have done a lot of good. So I try to be a bit dramatic ... because it is amazing how many people who have been helped. So a bit of a wow-feeling, that is what I want people to leave with.” — G6

4.3.2.2 Use of Humor and Anecdotes

Another way to keep the tour engaging, beyond passionate or dramatic language, was the use of humor. Teacher E3 felt that students benefit from a guide who can

joke with the students and keep the mood light. In their words, their most recent guide:

“Was fantastic at explaining and a bit witty at the same time. ... We want someone who is not dreadfully boring, but still serious. Because they are already talented in chemistry, so to speak.” — E3

A few survey responses mentioned humor explicitly, though it may also be included under other factors – such as “guide delivery” in the ratings (highly ranked at 73.6% in Figure 4.4) — or reflected in general free-text comments like “Really fun” or “Skilled presenters”. One visitor commented that “the fun explaining of everything” (V38) was something they liked about the tour.

From what guides expressed, they also believed humor to be a useful tool to set a more relaxed atmosphere. For example, guide G1 said:

“Humor, that is important. That is probably a necessity. It needs to be a bit fun, otherwise it becomes a bit stiff.” — G1

Guide G7 added that trying to get some laughs was also a good way to get an indication that the audience was listening.

“the whole thing I like to do is that I wanna make people laugh. ... It’s like the moment someone is laughing a little bit, even a tiny bit, I am like, ‘OK, that’s it. I got the attention.’” — G7

Although, like most things with the *Amazing Journey* it was also a matter of personal preference – something that is acknowledged by guide G6:

“But I really think that it is a matter of personality as well. Everyone probably does not run [it] so jokingly. ... It suits me well to have a bit of fun and [make it] a bit lighthearted.” — G6

During the observations, we noted the use of humor and how visitors reacted to it. How many jokes guides used, and how audiences reacted, varied greatly from guide to guide. For example, an upper-secondary science program, and a group of upper-secondary students in production technology, stood out as especially non-reactive to humor. Meanwhile, groups from an international network of university students in Gothenburg and an engineering leisure association featured plenty of humor and elicited frequent laughter. One difference between these groups could have been prior interest and their subsequent willingness to engage with the tour. The first two were teacher-initiated, whereas the latter required self-sign-up.

On average, there were a few jokes per tour, most of which were followed by some laughter. These clustered around blockbuster drugs presented in the “Our history” module and tied to anecdotes about their development – often highlighting somewhat absurd historical practices. These were the kinds of jokes guide G6 referred to:

“I tell it a bit like; ‘Well, you can understand that it would not really have worked like that now, if we [conducted drug trials like that]’ So I usually soften it a bit, but [I] think it is nice that there are things you can do that with.” — G6

In other words, they highlighted the use of anecdotes to create a more easy-going feeling to the tour, much like humor. Beyond humor, anecdotes also appeared in relation to the “why” of drug development. When asked what had the biggest impact, visitor 131 answered “how the research behind the best-selling drugs was innovated”, and at least a dozen others gave similar responses, highlighting the stories behind AstraZeneca’s medicines.

During both the history and therapy-area modules, we observed stories about patient needs that inspired innovation. As observers, we found that these stories set a more empathetic tone for the tour, highlighting the human connection. Guide G7 said, in their experience:

“When you talk about what you actually do, the stories behind it, I think [the visitors] respond nicely to that.” — G7

Similarly, internal stakeholder and guide I1 stated:

“I like to bring up anecdotes ... that, I think suits everybody. ... I think it makes it more personal.” — I1

In summary, both humor and anecdotes helped shape the atmosphere during a tour, when the audience was receptive.

4.3.2.3 Building a Narrative

How the different parts were used could create markedly different narratives, adding to the flexibility of the *Amazing Journey*. Some guides spoke of intentionally – or via the logical flow of module placement – spinning a cohesive tale of what AstraZeneca is and what it does. Teacher E2 mentioned a feeling of professionalism and attributed it to:

“That there was an idea from the start, a common thread [*Swedish: röd tråd*]” — E2

Moreover, one university student (V41) noted “that there was a coherent ‘storyline’ throughout” as a positive, while adding that “there is definitely an aspect that can also be developed further”. The guide perspective showed a similar pattern, with guide G2 saying:

“It is a story, it is not that I think that the one [module] is more important than the others, they all share a common thread [*Swedish: röd tråd*].” — G2

Although several guides mentioned building a storyline – especially when discussing module order – guide G6 was the clearest in wanting to tell the tour as a story with a logical flow. They mentioned that doing the tour in a different order and jumping between different subjects at random was difficult because:

“In some way you maybe want a clear beginning and a clear goal. That I think it is reasonable that it has. But I think the beginning is very strong and the end is pretty weak. ... But I still like that there is a story

here. We tell it, and if I get to do it like I want, then it is like this it should start so that it makes sense.” — G6

More than focusing on a fixed module order, internal stakeholder and guide I2 instead emphasized storytelling as a key tool for adapting the tour in order to drive home different messages during VIP and business visits:

“If I need to emphasize parts concerning that we ‘put the patients first’. . . Then it is those parts I highlight; it’s the [therapeutic areas]. It’s the message around the science, to present where we on the site are.” — I2

They also mentioned the history module and argued that how history can show the company’s momentum:

“The most important part is not to explain what happened in the past. The most important part is to show how we ended up where we are and where we are heading. So, for me the history is a tool to talk about where we are going. . . So that we can have a chronological storytelling that is of use for us.” — I2

4.4 Module Utilization and Interactivity

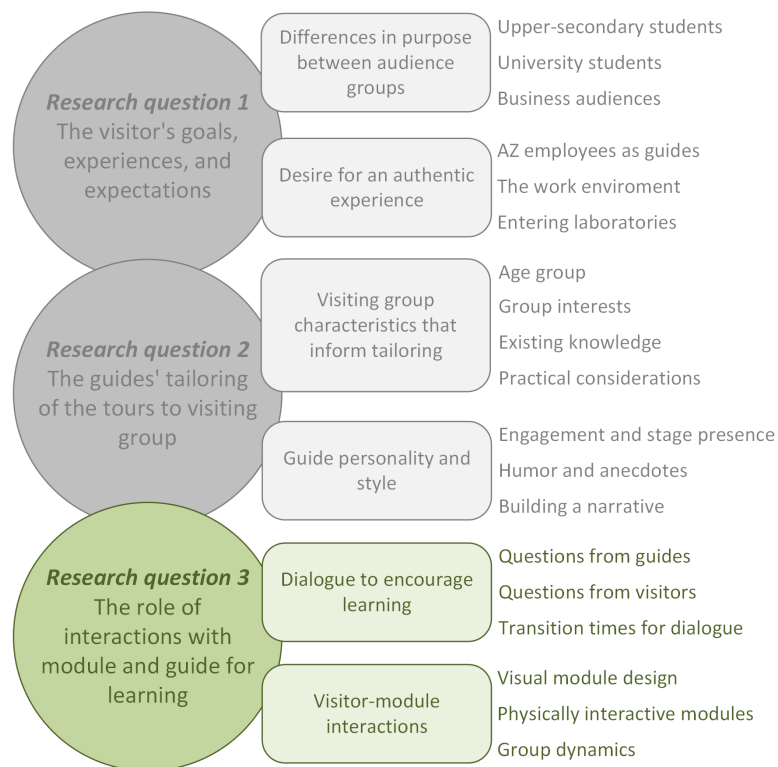


Figure 4.8: A structured overview of findings, mapping themes to each research question. Topics covered in this section are marked in green.

This section presents results addressing research question 3: *How are the modules used to support the guides' explanations, and aid visitors' understanding of the tour content?* (see Figure 4.8). Namely, Section 4.4.1 investigated questions from both guides and visitors, and how these and other factors contributed to interaction in the form of dialogue. Following that, we examine how the modules supported interactivity and learning more broadly.

4.4.1 Dialogue to Encourage Learning

During the interviews, guides emphasized that the tour became more dynamic and engaging when it included dialogue. As noted in Section 4.3.1, simply asking visitors what they wanted to hear helped guides tailor the remainder of the tour. Also, if someone asked questions, the guide and visitors came emotionally closer. Internal stake holder I3 put it:

“You very much want that people ask questions, or that you yourself asks questions.” — I3

4.4.1.1 Questions From the Guide

Guides' questions ranged from the straightforward “Are there any questions?” before moving to the next module, to discussion questions that invited visitors to think, discuss, and guess. In our observations, nearly all guides invited questions – periodically if not at every stop – and they typically told groups at the outset that interruptions and questions were welcome at any time. To achieve the dialogue they sought, guides worked to create an unpretentious atmosphere and presented themselves as approachable, so visitors felt comfortable asking the first question. The social pressures within the group that may have shaped this atmosphere are examined further in Section 4.4.2.3.

The discussion-friendly prompts used routinely by some guides included “What ro-dent can cough?”, “Roughly how much does it cost to develop a drug from idea to patient – and how long does it take?”, and “Why are only young, healthy men allowed to volunteer in early clinical trials?” These questions prompt audiences to pause, think, discuss, and offer multiple answers. We observed that such early engagement tended to carry over to the rest of the tour, with visitors remaining more engaged throughout.

On the same note, one guide used show-of-hands questions to initiate dialogue:

“Quite early when one talks about historical medicines, Xylocain, then you can ask how many have been to the dentist? Then it's like hands up, and how many have gotten an anesthetic there? Yes, then it's hands up, and then you've caught a few.” — G1

When a group was nervous or timid – as observed with upper-secondary students – some guides opened with light questions to loosen them up, while others struggled to warm the atmosphere because they used few low-stakes questions early on.

Another guide noted that, if no one responded initially, they looked for one or two students who seemed receptive and directed a question to them, or invited them to try an interactive element:

“Most often it goes silent, but then you can single out someone you’ve noticed perhaps was – some people may come up and ask questions before you start, or you just end up next to someone you chat with quickly – so you can just take that person and ask.” — G1

4.4.1.2 Questions From the Visitors

According to teachers E1, E3, and E4, their students did ask questions, partly because the guides were effective at inviting them – and this creates openings during the tour for Q&A. The students asked questions that concerned their future and what they needed to know to consider AstraZeneca as a potential future employer. One teacher explained:

“They don’t know that much in-depth about the actual drug manufacturing, so it is more hands-on questions that are a bit about their future.” — E3

Another teacher confirmed that the guides provided opportunities to ask questions:

“During the tour there was always moments where we could ask, and that’s also important – that the guide opens for questions, that there is time, and then there is the possibility to ask questions” — E4

However, in roughly half of our 24 observations (often those with students) we noticed a quiet, timid atmosphere during the entire tour. Another teacher believed that a more interactive start would have made their students more at ease to ask questions:

“If they would’ve had started with something a bit lighthearted at the beginning with some little kind of [quiz question] or something. Then I think that they would have had them along in a completely different way. Then they would also felt that it was more unpretentious to ask questions.” — E1

In the survey, an upper-secondary student (V46) responded that the tour “did not feel particularly question-friendly, I would’ve liked to ask more questions.” We thought that while experienced guides aimed for dialogue, not all actively foster it, so some visitors may have experienced the tour as one-way communication. Also, according to the guides, it was not always feasible to have a lot of dialogue for every student group; it depended on students’ ability to behave appropriately and stay on task.

On another note, guides agreed with the upper-secondary teacher who stated that the teacher’s role during the tour was to chime in with leading questions so the guide could answer in a way that taught the students something:

“If you want the students to learn something, you can ask the guide a leading question that you already know the answer to. That way the students get the information, but not from the teacher this time.” — E2

Another teacher said this about the teacher’s role:

“But then, explaining to the guides what the students know. ... [They] are often a bit shy and they don’t ask questions. So, I have to make sure that the students ask some questions and if that doesn’t work, I ask my own questions so the students see how to ask questions.” — E4

We also observed that how guides responded to the first few questions or comments was crucial for signaling that the floor was open and any questions were welcome. For example, when a guide gave a simple yes-or-no answer without further elaboration, it left little room for follow-up questions, and could discourage visitors. It also signaled that the effort of asking might not yield the insights they were seeking.

4.4.1.3 Using Transition Times as Opportunities for Dialogue

A positive consequence of the spread-out modules was that walk time between them could be used, both as a mental pause and an opportunity to ask one-to-one questions. One of the founders, I1, said that this was intentional, so interested visitors could take that time to ask further questions one-on-one. Internal stakeholder and guide I2 valued this walk time and said that one of the benefits of the *Amazing Journey* is:

“The in-between conversations it gives opportunity for. ... Then you can take [some information] when you walk between modules. ... The walking time is valuable.” — I2

From the guide’s perspective, having a co-guide who walked at the back to make sure everyone kept up created a low-threshold moment for visitors to ask individual questions. Guide G5 said:

“It is easier to ask questions and talk more personally [with the co-guide], which is fun, because not everyone takes the opportunity when invited [in group]. And especially if you walk at the back of the group, ... you usually have time to talk.” — G5

Another aspect of having the modules spread out was that it gave a small break and small activity to regain focus. In guide G7’s opinion:

“People ask more questions [between modules]. It comes back to, you know, they’re less timid and they start coming to you or the other guide. ... It’s better to move, because you know you’re 90 minutes [sic]. Imagine being 90 minutes in a room, ... at least by walking you need to move. You need to have a bit of activity there.” — G7

4.4.2 Visitor-Module Interaction

As another aspect of interactivity, we examined how the modules contributed to engagement, supported understanding, and helped create a lasting impression. Free-text responses referenced these elements frequently: 35 visitors specifically cited interactivity and visual design as positive aspects of the tour. In the following sections, we reported three results: the modules' visual design, how the modules were used in practice, and how group dynamics shaped the experience of the tour.

4.4.2.1 Visual Design of Modules

The importance of visually impressive modules was one of the tour-execution factors assessed in the survey and presented in Figure 4.3. Although this factor ranked third last (out of nine), it was still rated as either very important or crucial by just over 40% of the visitors, and important by approximately 40% of the others. In the free-text responses, 35 visitors cited interactivity and visual design as positives, for example:

“The visual elements” — V114

“The animations in the dark room” — V147

“Very nice models, videos and visuals” — V122

“The interactive and visual spaces” — V72

Several comments referred specifically to the “dark room” (Modules 4 and 5), which differed from typical work environments as it concentrated many of the more dynamic features (projections, videos, and models) and was thus more atmospheric. The guides also highlighted its impact. As guide G6 noted:

“So a bit of a wow-feeling: that’s what I want people to leave with. And it can be a bit tricky, because the dark room is a bit wow, but not all modules are wow. And then you have to hype it up yourself.” — G6

Guide G1 similarly emphasized the dark room’s impressiveness. At the same time, features that created a “wow” effect for some could have been uncomfortable for others. A few visitors described certain elements as overly intense:

“It might also be good to think about possibilities to sit down throughout the tour as well as give warnings for people with motion sickness.” — V45

“Some of the exhibition areas were quite sensorily intense.” — V42

“The heartbeat audio in the lab section was slightly annoying.” — V29

These responses indicated that highly stimulating visuals can enhance the experience for many, but can have a negative impact for some.

Beyond aesthetics, some guides mentioned the role the visuals played in supporting their explanations. Internal stakeholder I4 noted that their satisfaction with a module depended strongly on how easy it was to speak about. Several guides reported

occasionally skipping or hurrying through certain modules if they struggled to find a clear narrative, with the sustainability module often given as an example. Additionally, several guides (G3, G5, I1, I4) expressed frustration with modules that were hard to operate while talking, for example, the joystick in the patent module (module 9) and the rotating dial in the Idea-to-Patient timeline (module 8).

4.4.2.2 Use of Physically Interactive Modules

Beyond visuals, the *Amazing Journey* included numerous physically interactive elements, such as buttons, models, touchscreens, and games. In the survey, interactive modules were rated lower than several other factors; nevertheless, about 70% of respondents rated interactivity as important or above (Figure 4.3). Free-text answers also indicated a clear appreciation for those elements:

“[I] like all types of interactions.” — V103

“Fun that you got to press a few buttons, etc.” — V97

“It was fun with things you got to try yourself, and I would have liked more of that.” — V50

“Especially in the start when we get to interact and put ourselves in the tour.” — V113

From what we observed, more visitors were willing to interact with the modules in lower-pressure situations. When the rest of the group moved on, a few often remained to read, photograph, or physically interact with the modules.

Interactive moments also loosened up more timid groups – particularly upper-secondary students – and sparked conversations between visitors. During one upper-secondary tour, the guide paused in the dark room (modules A.4 and A.5) to let students explore the interactive elements on their own. Some competed against the high-throughput screening robot (see Figure A.14) while others tried different stations. After this short pause, the atmosphere shifted and questions increased from none to five by mid-tour. This type of short break for individual exploration was also observed on a few other tours, but was rarely explicitly announced by the guide and did not appear to be preplanned.

However, some guides actively invited interaction without breaking the flow of the tour by recruiting volunteers from the audience to, for example, press buttons on the display while they continued speaking. Guide G3 explained that they did it to spark interest and get the visitors engaged. They mentioned the mortality module (module 3) as a good place to incorporate this because it had:

“A few buttons - it’s got a bit of touchscreen and stuff like that. So if I can talk, they can stand there and click. The dream is those times when it happens that they’re standing there clicking and stop listening to me. That’s the best, because then they start thinking for themselves.” — G3

Teachers echoed the value of such participation for their students:

“They think it’s fun to press things. When we were in the dark room, then you could press more on the dolls and see how drugs are released, ... but then [the guide] pressed on the doll instead. ... And it might be what [the students] really want: to be more included in the [tour].” — E3

There were, however, practical constraints with interactive modules for larger groups. As the internal stakeholder I3 put it:

“If you have a group of three, then you can stand and fidget a bit more, ... but if you have 20 people then it becomes very hard to see. Then you just have to [show it].” — I3

Some modules lent themselves to one-person interaction (e.g., the high-throughput screening game in module 5, Figure A.14), while others created visual or auditory effects that the whole audience could experience even if only one person directly interacted (e.g., the heart model in module 3, Figure A.9), and a few allowed whole-group interaction (e.g., the straw activity in module 3, Figure A.10). This limited how active each participant could be in larger groups, but also reduced pressure on those who preferred not to engage. The next section examines how group composition influenced these interaction patterns.

4.4.2.3 Group Dynamics and Interactivity

As previously stated interaction could not be considered without also accounting for how group dynamics affected the individual actions. One dimension was group size. The guides had personal preferences regarding ideal group size, but all agreed that the main constraint was how many people could physically fit in the spaces and still see and hear everything. Similarly, visitors ranked small group size as the least important of the nine tour-execution factors (Figure 4.3). Even so, several guides suggested that group size could affect interactions. Guide G5 observed that, for larger groups:

“Maybe it depends on the group, but often it is less interaction - strangely enough. Or actually, maybe it isn’t that strange, but it should be more questions in a larger group really.” — G5

Guide G2 noted a similar pattern and attributed it to a greater psychological safety in smaller groups. Guide G1 also emphasized that there might be a fear of asking “stupid” questions:

“They are scared to embarrass themselves in front of the group, and that is difficult. What good question can they have?” — G1

This sense of social safety was also affected by the pre-existing relationships within the group, something that became apparent when comparing two visits from the same international university-student network. In the first visit, most participants seemed unfamiliar with one another, and while some questions arose during transition times (see Section 4.4.1), almost none were asked in front of the whole group. In the second visit, about half were classmates with an already established relationship

of trust. That subgroup asked questions (often with multiple follow-ups) during most modules and held side discussions that occasionally drew in other visitors too.

Existing trust was observed to increase interaction, but motivation also mattered. For example, upper-secondary students attending as part of a teacher-planned activity were often less inclined to engage actively. This reflected lower interest, rather than a lack of social safety, even though both may affect the situation. In contrast, the tour with by far the most questions involved recent upper-secondary graduates who had initiated the visit themselves and already were a cohesive group.

Circling back to group size, a practical consequence of larger groups was physical distance from the guide. Larger groups inevitably left some participants farther away where the guides are harder to see and hear. We observed a clear correlation between proximity and attentiveness: those close to the guide listened more intently; those on the periphery were more likely to check phones or whisper. One example of this involved upper-secondary students in production technology, who were shown the manufacturing showcase hallway as an add-on to match the focus of their course focus. In the long, narrow corridor, the space between visitor and guide was amplified and thus also the effect of distance. The farther students stood from the guide the less they appeared to listen. Those at the back also struggled to see the equipment being discussed, likely enhancing the feeling of distance and disinterest.

Losing contact with the audience due to distance was also brought up by guides G4 and G5. G4 explained that for larger groups:

“It just ends up that you maybe don’t feel, in an interactive way, involved. Instead it becomes more that they’re just standing there and listening to someone who’s far away.” — G4

When facing disengaged audiences, several guides (G1, G3, G4) reported a strategy of zeroing in on one or a few visitors who were more willing to interact, and who could act as catalysts for further interaction. As Guide G3 said:

“I would say that I usually rather quickly identify two people who are a bit more clicking inclined [*Swedish: klick-vänliga*], and then you can propel the group with them. ... Because you can usually get some people involved in the interaction.” — G3

Our observations also supported that once a few interactive moments had been incorporated, or a few questions had been raised, the barrier for further participation tended to lower.

We also observed reduced physical and social distance during a visit from a foreign embassy, where a single guide addressed one visitor directly while an assistant primarily took photos. The visitor showed clear interest and focus on the guide, asking affirmative and follow-up questions. In this one-to-one format that is more typical of business and VIP visits, discussion flowed more easily and dialogue felt more natural.

In summary, the results considered how the purpose the *Amazing Journey* filled for various groups, and how all groups desired an authentic experience of work

at AstraZeneca. Moreover, we examined what efforts the guides made to tailor the tours to these varying needs, included guide style. Finally, we looked at how interaction shaped the learning through dialogue, modules, and social dynamics.

5

Discussion

In this chapter, the study’s results and theoretical foundation is connected and discussed in relation to the research questions (RQ), then moving on to concrete implications and limitations of this work, and closing with topics that future studies could investigate further.

5.1 Discussing the Key Findings

In this section, the most prominent findings from the results are expanded upon and considered in relation to the frameworks, models, and studies presented in Chapter 2. Sections from the result are also integrated to show larger patterns and better help answer our three research questions:

- What do visitors hope to gain from the visit, and what similarities and differences emerge across target audiences? (RQ1)
- How do guides at AstraZeneca tailor their tours to different visiting groups? (RQ2)
- How can visitor–guide and visitor–module interactions support the learning in a modular tour? (RQ3)

5.1.1 Visitor Purpose

We found that visitor purpose varied by group and that upper-secondary, university, and business audiences all had some characteristic differences from each other (RQ1). Our interviews with recurring upper-secondary teachers indicated that their primary aim was to inspire students toward STEM and give them the opportunity to experience a real research workplace.

In Section 2.1.1, about non-formal learning, it was stated that the *Amazing Journey* tour is held in an authentic context, and that such authentic experiences can spark motivation and engagement among the student visitors according to (Johnson & Majewska, 2022). In this setting, the intended learning is non-formal according to Johnson and Majewska’s (2022) categorization: visitors were not assessed or credentialed, but they still acquired ideas and made connections in a relaxed, engaging way. In line with this, the teachers emphasized the experience aspect rather than

direct classroom application. However, as stated by Allen (2004) in Section 2.3.4 on module design, the design should still prioritize learning, and not only entertainment – the modules should inform while remaining accessible and enjoyable.

As noted in Section 2.1.3 regarding field trips, teachers should, according to Behrendt and Franklin (2014), follow a set checklist of actions before, during, and after a visit to help turn a field trip into long-term learning. When we asked about their own practice of preparation and follow up, most interviewed teachers said they did little preparation beyond briefly explaining what AstraZeneca is, because they considered pre-teaching content less important than the on-site experience itself. With that said, when topics like organic chemistry arose later in the year, teachers said they referred back to the AstraZeneca visit and therefore hoped the tour would be tailored in ways so that they could follow up on what the guides had introduced.

Furthermore, the survey responses showed that upper-secondary students mainly wanted to learn about the science, research, and technologies, even if the details could sometimes be too advanced to fully grasp. However, interviewed teachers put more emphasis on understanding what it is like to work at AstraZeneca as one of the main insights the tour should impart on their students. This was reflected in the questions students asked, which frequently focused on the guides' backgrounds, career paths, and what it is like to work at the site. This is also reflective of the desire for STEM role models, something that is elaborated on in section 5.1.3.

The overall purpose was the same for university groups, but the interviewed professor for that grade level (E4) required a closer alignment with course content. Their field-trip approach echoed Kolb's (1984) Learning Cycle (Section 2.1.2) with students first gaining concrete experience by engaging and asking questions during the tour. Second, they then made reflective observations in post-visit discussions. Next, through abstract conceptualization, they compared what they observed with prior classroom learning. Finally, they approached active experimentation, where the visit served as a memorable anchor that students could draw on when encountering similar situations in the future.

For business-related visits, the main purpose discovered in the interviews and survey was to build and strengthen relationships and then to discuss the meeting topic after the introductory *Amazing Journey*. Broadly, these visitors sought essential background on the site and how AstraZeneca's drug-development operations work, so they could grasp the business context before focusing on the specific purpose of the visit or meeting.

5.1.2 Authentic Experience

As shown in Section 4.2.2, many student visitors sought an authentic experience (RQ1): nearly 30% survey respondents explicitly wished to see and learn more about the science and day-to-day work on site. They came to an R&D facility expecting to see the environment where the work happens. Our interpretation is that visitors often equated authenticity with seeing the labs, and assumed that a visit is incomplete without a lab encounter. That perception is understandable since

laboratory work is what sets this site apart. However, it is important to remember that a quick look at a lab bench in a viewing corridor does not, by itself, show what it is like to work at AstraZeneca Gothenburg or the breadth of ongoing research.

The decision not to take visitors into active labs is not only about minimizing disruption to researchers; practical constraints, such as restricted access, safety requirements, and limited space, also make it non-feasible to bring everyone inside. These constraints help explain the current format of the *Amazing Journey*. To address this, tours should continue to reveal the full range of roles, workflows, and collaborations (e.g., the growing use of computational discovery and work in clinical studies). All things considered, the question of showing the labs has no simple answer, and the optimal solution would be to find a safe and practical solution that still feels authentic. Consequently, because lab access was the element most frequently cited as missing by students, safe and feasible options — such as viewing corridors, live feeds, or brief, controlled lab glimpses — should still be considered in future updates even if they cannot alone give the broad perspective also desired.

Moving on, we found that the experiential learning cycle (EduCorpus, n.d.; Kolb, 1984) is only partially applied for most groups, which according to Kolb’s model hinders the full potential learning from this authentic experience. In the interviews, teachers told us they often provide limited preparation, and we observed that they often hand students over without bridging questions or classroom links, and do not consistently help maintain focus during the tour. Post-visit debriefs and reflections were frequently absent as well. This leaves the field trip’s potential for deeper processing and connections to prior knowledge largely unrealized, leaving out on central parts of the experiential learning model.

5.1.3 STEM Role Models

In Section 2.4.1, we identified five core role-model qualities of Aish et al.’s (2017) twelve that transferred to the *Amazing Journey* guides. Similar to the predictions of these five qualities, the *Amazing Journey* visitors wanted to see, feel, and understand who the guide was and how their career path unfolded (RQ1). This helps explain the visitors’ strong curiosity about guides and why, as five guides noted (Section 4.2.2.1), the guide’s personal experience should frame the narrative because it creates emotional connection and inspiration. When guides withheld personal background, visitors often asked for it instead.

Across our observations, research-active guides often inspired students enough during the tour to spark deeper one-to-one conversations afterward, offering realistic, relatable role models students could engage with and learn from (see more on dialogue in Section 5.1.6). As highlighted in Section 4.2.2.1, meeting employees and hearing their personal stories motivated visitors, gave concrete insight into what it is like to work at AstraZeneca, and offered credibility to the guidance they provided. This, in turn, increased interest in the guides’ roles, backgrounds, and career paths. Guides who have worked at the site for some time typically bring cross-functional experience and memorable anecdotes, which can further energize (some) visitors and draw them closer to the storyteller. The importance of presenting a non-outlier

narrative – showing how resilience and sustained passion led to their current role – aligns with Aish et al.’s (2017) core qualities students value most in role models.

5.1.4 Tailoring

Tailoring is always done with the visitors’ and AstraZeneca’s purposes in mind, and the guides interviewed often described tailoring decisions as dependent on one of four factors (RQ2); age, interest, prior knowledge, or practicalities. Regarding age, the guides talked of using more interactive elements to keep younger people engaged in the proceedings, and covering more business details for older people. Specific areas of interest expressed before the tour can often result in adding special features (add-ons). Otherwise, adjustments were often minor and decided during the tour. As for prior knowledge, adaptations in level of technicality and language were common as a result of specific questions from the visitors. Finally, practical considerations such as time, space, and disturbances may have influenced tour adaptations logistically, but were not especially useful for tailoring the tour to a specific group.

As previously mentioned, these factors are probably not independent of each other. For example, experience comes with age, and prior knowledge might have sparked a greater interest. However, these distinctions provide the guides’ view of the target audience segmentation, relating to Section 2.2.1 on market segmentation theory. The characteristics of the *Amazing Journey* would according to Wedel and Kamakura’s (2000) categorizations suggest that sorting a visitor group into a specific category (segment) should be fairly easy (identifiability). And while the surface level characteristics (such as university students, municipality worker, or healthcare provider) were indeed easy to identify, specific interests were less observable and therefore harder to adapt to.

Additionally, one might consider the feasibility of making suitable adaptations (actionability) and how effective the tailoring actually is at meeting the visitor’s needs and wants (accessibility) (Wedel & Kamakura, 2000). A good example for this is the add-ons that guides reported using for targeting specific interests. On one hand, the guides had some common adaptations to pick from and making adaptations is thus fairly easy. How well the add-on landed is however dependent on many factors. Most of the time the add-ons are good additions, but they can also be counterproductive if they drag out too long for the group to keep up focus or if the guides have misjudged interest or degree of prior knowledge. Thus, the clarification of expectations from the visitors – both before and during a tour – is key for guide tailoring. As a part of this, conducting effective evaluations after visits is also an important step to identify any mismatch in expectations, and to be able to better tailor future tours.

Moreover, this links back to what was said in Section 2.2.2 on andragogy. It was explained that, according to Knowles’ assumptions about adult learners (Merriam et al., 2006), adults are more motivated and interested in learning if (1) they feel the information is adapted and relevant to them and their interests, and (2) that their lived experience is accounted for and acknowledged. Clarifying expectations prior to the tour is an effective way to involve the learners interests and make the

content directly relevant to them. As for the second point, we found that the guides tried to account for prior knowledge by outright asking or making informed guesses and reading the groups reaction. Our results suggests that this approach works sufficiently, as most people expressed it being a good level even if some people would have liked a bit more or less depth. However, like all on-the-fly tailoring during a tour, being able to adjust explanation level relies on the guides' ability to accurately read the group and their ability to communicate clearly. Hence, this is also – at least partially – dependent on guide experience.

Finally, our results suggest that the guides are a major contributor to the tour's success, and so is successful matching of guides and visitors. They should act as role models (see the previous section), bring enthusiasm to inspire and entertain (see the upcoming section), and provide extensive knowledge about both the science and AstraZeneca's internal processes. It is therefore no surprise that the visitors wanted guides with expertise and interests that closely matched their own. Thus, the guide matching process and the use of employees as guides should be considered integral parts of both the tailoring and this tour concept that contribute to the visitors' positive experiences.

5.1.5 Guide Style

Because of the overall importance of the guide, the guide's stage presence and delivery of content are integral parts of how the tours are tailored (RQ2). Guiding style is primarily about creating a dynamic delivery of the information through multiple means. We found that passion, language, humor, anecdotes, and storytelling can all be used to create the desired atmosphere and emotionally connect with the audience. However, the extent to which *Amazing Journey* guides used these approaches varied by individual; but generally, the guides used one or more of them. Moreover, because guide delivery was highly ranked by the visitors, we conclude that it played an important role in the visitor experience.

Openness, passion, and positive visitor interactions were frequently cited as positives by many visitors, and this aligns with two of Tsaur and Teng's (2017) guiding styles; customer-orientated and cultural ambassador (presented in Section 2.4.2). We believe that the passion shown by the guides is imperative to convey their emotional investment to the visitors, and is also a part of if the guide would be considered a role model. One way passion can be shown is through the language utilized, such as using high-arousal language (as described by Xia et al. (2025) in Section 2.4.2). Because of the breadth of our observations and the difficulty of recording specific phrasings, observations regarding high-arousal language were few and likely not representative. Hence, a more focused study would be needed in order to draw firm conclusions on that point. In contrast, Tsaur and Teng's (2017) point about eloquence finds support in the survey responses, where visitors clearly valued easy-to-understand content, and appreciated the guides' explanations.

As also mentioned in Section 2.4.2, humor has been shown to positively impact learning by triggering emotional engagement by Masek et al. (2019). We found that humor was also important for the *Amazing Journey* and the visitor experience it cre-

ates, supported by observations, survey answers, and interview findings. It provided entertainment, and consistent with Tsaur and Teng’s (2017) findings, created a more relaxed atmosphere that lowered social pressures. Anecdotes had a similar function, but also provided a piece of human connection, countering the misconception that large pharmaceutical companies only care about revenue.

Finally, guides mentioned that storytelling – or building a narrative – helped set a clear intention and goal that provided context and direction for the tour’s information. This aligns with Tsaur and Teng’s (2017) point about guides being fully prepared, and results in tours that feel well thought out and professional (provided sufficient tailoring of the included content has also been made).

5.1.6 Learning Dialogue

As presented in the Section 4.4.1 both guides and engaged visitors valued dialogue during the tour (RQ3). It opens space for rich discussion and often leads to one-on-one exchanges between the guide and inquisitive visitors, as previously discussed in Section 5.1.3 on role models. We have observed that questions from both guides and visitors, together with a shared willingness to interact between modules, helped create dialogue. Even though experienced guides often aim for a dialogic tour, it is not always possible or appropriate – for example, when a group’s disruptive or inattentive behavior makes interaction impractical. Our findings suggest that whether a learning dialogue emerges depends on several factors: group size, the group’s social dynamics, and the guide match. The impact of group size and social dynamics will be examined further in Section 5.1.8. If the guides manage to effectively tailor the language and content, it reduces psychological distance as described by Xia et al. (2025) (see Section 2.4.2), helping visitors feel close enough to engage with the guide’s story without the material going over their heads.

As previously mentioned, a core aspect of the tailoring is using dialogue to inform adaptations, this creates the conditions for a learning dialogue during the tour. When the guides adjust language, tone, and depth during the tour, they lower barriers to participation and make visitor engagement through dialogue more likely. In the survey, respondents often noted that the tailoring felt appropriate and that the guides were clear and easy to understand, which would correspond to a good climate for dialogue.

Linking to Sweller et al.’s (2011) cognitive load theory (Section 2.3.1), guides also mentioned in interviews that they try to connect new information to visitors’ prior knowledge to reduce the cognitive processing demanded. Transition times help as well since the short walks between modules gives listeners a chance to pause, digest, and prepare for the next segment. As noted in Section 4.4.1.3, some visitors used these transitions to ask the co-guide questions, especially when the group atmosphere was less question-friendly.

In practice, the dialogic atmosphere varied by group. Some business and university groups willingly asked questions and co-shaped the tour, while others – often upper-secondary classes or mixed university groups without a prior relationship –

remained quiet, leaving the guide to carry the narrative with few questions.

5.1.7 Module’s Design, Practical Use, and Interactivity

Visually impressive modules that can create a wow-factor was a positive element for many visitors, and something we found to be important for creating memorable experiences and shaping perceptions of the site, which is as important as the learning aspect (RQ3). However, as emphasized by (Allen, 2004) (Section 2.3.4), the design needs to be sufficiently universal to work for everyone. This includes factors like group size, and varying levels of prior knowledge, but also accommodating for sensory and medical variation. For example, a substantial number of visitors mentioned either a desire for more places to sit down or warnings before sensory-intense modules (like the projections and heartbeat audio in module 4). Establishing the routine of warning visitors is an easy accommodation that can make the tour more accessible and enjoyable for a broader range of visitors.

We found that many visitors greatly appreciated the interactive sections for their entertainment and novelty. Additionally, exciting interactive moments can help keep the visitors engaged and interested by creating breaks from continuous listening, much like transition times, which act as natural pauses for processing information. Allen (2004) also encourages hands-on activities, but only if they serve a specific purpose. Accordingly, physical interaction in modules should always be done with a clear aim to facilitate learning, something that is already evident in many *Amazing Journey* modules. For example, breathing through straws in module 3 serves the purpose of creating understanding and empathy for patients with chronic obstructive pulmonary disease (COPD).

The ICAP model (Chi, 2009; Chi & Wylie, 2014) further describes different kinds of interactions as more or less beneficial to learning (Section 2.3.3). Some of these interactions are more difficult to facilitate in the *Amazing Journey*, either because of the nature of a tour or because of the group size. Group size will be expanded upon in the next section, but generally we observed mostly passive engagement with occasional moments of active manipulation, question generating, and more involved discussion with a guide or peer. Moreover, if the group is larger, the opportunities to interact decrease. Examples include that the modules can only be manipulated by one or a few people at a time, only so many people can be involved in discussions with the guides, and so on. Hence, it is important that the tour is designed with flexibility regarding module use. For example, the straw activity is a great way to include everyone in the interaction, and the mortality data from WHO (World Health Organization) can be interesting to view even if you are not the one manipulating it, which makes these interactions great options regardless of group size.

In addition to impressiveness and interaction, well-designed visuals can also aid in creating dialogue and facilitate learning. Cognitive load principles - such as the split-attention, modality, and redundancy effects (as described by Sweller et al. (2011) in Section 2.3.1) - are useful for designing the modules and script in a way that supports learning. The split-attention effect says that separate visual sources for

information creates a higher cognitive load; in the context of *Amazing Journey*, this could mean labeling parts of a machine on the part itself instead of providing a separate key/legend to the side to lower the cognitive load. However, a change like this also limits the possibility for the guide to quiz the visitors in order to create interaction, and design changes should thus not be done without also considering interactive dimensions.

Moreover, the supplemental text next to the modules becomes somewhat redundant for visitors when accompanied by simultaneous guide explanations. The text can be of use to guides who do not have the script with them (for example during impromptu tours with inexperienced guides) or employees walking the tour by themselves, but for most groups it simply serves as additional content for the visitors to absorb, increasing cognitive load. Finally, and perhaps most relevant to a guided tour exhibition, is the modality principle. This principle dictates that auditory and visual aids can significantly reduce cognitive load, provided they are complementary but have a clear link. From what we observed, the links between the visuals and what the guides are saying was often clear. However, in some cases the script material did not entirely match the visual representations. For example, in module 4 emphasize was put on AI in the script, but the visuals showed something else, because AI is a new addition to the tour. Similarly, module 6 had issues with larger groups being unable to see the visuals, which hinders the full effect.

5.1.8 Social dynamics effect on interactivity

Visitor-guide and visitor-module interactions (RQ3) cannot be fully explained without also taking into account social pressures and processes that affect willingness to engage and interact with the tour in different ways. This section therefore discusses the major social dynamics we could observed affecting visitor groups.

The guides reported that they often perceived a lack of social safety in larger groups that hindered interaction; for example, it increased reluctance to ask questions. Moreover, observations showed that in pre-established groups, visitors asked more questions in front of the whole group (provided you control for level of interest by only comparing groups with optional attendance). Both of these reflections can be explained by how feelings of psychological safety are affected by group size and group maturity respectively. In section 2.4.3 on social dynamics, it is noted that both Chan and Smith (2024), and Bergey (2024) found that large group sizes have a negative impact on the willingness to ask questions. Aligned with our findings, they found the underlying reason to be the desire to manage others' impressions and fear of judgment. Similarly, Wheelan and Tuckman's models of group development (Tuckman & Jensen, 1977; Wheelan & McKeage, 1993) from Section 2.4.3 explain that newly formed groups might be more tentative and aware of other's impressions, thus decreasing psychological safety and interactivity.

Group size may have also contributed to the decreased interactivity because of the lower group trust and commitment it can create, as described by Soboroff et al. (2020) in Section 2.4.3. Moreover, the pattern of interactions lower on the ICAP scale being more prevalent with larger group size observed by El-Mansy et al. (2024)

was also present in our results, for example in having many people physically interact with the modules only when the rest of the group had walked past. However, the difference was not major and other contributing factors might be the social expectation to stand still and listen as someone is speaking to a group, and the general interest of the group.

Finally, physical distance between guide and visitor was observed to be negatively correlated with engagement level. However, here the direction of causation is unclear; one explanation might be that physical distance makes the guide harder to see and hear, creating a social distance that leads to disengagement. In larger groups it could also be that the less engaged individuals intentionally place themselves further away to escape the guide's attention, and perhaps chat with a friend or check their phone. Whatever the cause, the outcome is unchanged and indicates that group size should be limited and spaces designed to ensure that the guide and modules are audible and visible to everyone, even in larger groups.

5.2 Implications

Some of our findings can be generalized beyond a single site to any guided, modular visit where visitors vary in age, background, and purpose. Five implications stand out as relevant for designers, organizers, and guides of scientific modular guided tours for adults.

First, the modular format should be used deliberately both when designing the tour, in clarifying its purposes, and during guiding. The strengths of a modular format are flexibility and the possibility to build a storyline that fits the situation; its weaknesses appear when modules are skipped without coherence, or when niched add-ons falls short for certain groups. One should select and order modules to fit the stated purpose, and keep a clear through-line so visitors can connect actions to ideas.

Second, authentic experience matters, and the tour should be structured by the designer to account for this. In this study, students frequently missed seeing labs, so access to lab views or credible viewing corridor should be considered in future updates of the *Amazing Journey*. More broadly however, when designing tours to showcase company activity, consider not only what the company wants to present but also what the audience perceives as authentic and distinctive for that company. This should also be kept in mind when guides tailor the tour.

Third, it is important to clarify expectations up front. Organizers and guides should briefly confirm the audience's aims and level before or at the start of the tour by outright asking, and explaining what the tour will and will not cover.

Fourth, tailoring done by the guides is essential to fully utilize the tour flexibility. Adaptations should be kept lightweight and systematic by (a) guides asking about prior knowledge and interests at the outset, (b) matching expert guides to group needs, and (c) adjusting language and depth to reduce cognitive load.

Last, guides should make learning interactive and engaging: invite early, low-threshold questions, weave in dynamic explanations (humor, storytelling, brief anecdotes), and include hands-on or decision points that tie activities to core concepts. Sustain the tour with continuous evaluation (short surveys or pulse checks) to monitor whether delivery, level, and pacing are landing as intended.

Together, expectation setting, purposeful modular design, interactive delivery, and continuous evaluation provide a useful playbook for improving guided science experiences in companies, museums, and universities.

5.3 Limitations

This study reflects a single setting only: a large pharmaceutical R&D site in Sweden in 2026. Some of our results may therefore differ in other industries, countries, or time periods, as practices, cultural norms, and tour designs change. The previously mentioned general implications are likely useful for comparison with other non-formal learning settings or guided tours.

For the interviews, we selected participants who would contrast and complement one another to obtain a wide range of insights. The interviews provided sufficient depth, but not every point was verified with multiple participants; some views may therefore reflect an individual perspective rather than a shared one. We acknowledged and accepted this trade-off, however we do not believe it alters our main conclusions, though broader confirmation might have strengthened the conclusions.

The most consequential limitation is the uneven mix of audiences. We had limited access to VIP and other business-focused visits, and the visit coordinator generally deemed it inappropriate to ask those visitors to complete surveys. Consequently, we have fewer observations and survey responses for business audiences and many more for upper-secondary – and especially university – students; our analysis reflects this imbalance, with greater detail on student groups and distinctions within that audience.

Finally, a few survey question alternatives could be read in more than one way, which can affect answers. For example, some interviewees asked whether “AstraZeneca’s history” meant only the site’s founding or also the history and stories behind developed drugs. Such uncertainty likely introduced some measurement noise and potential under- or over-weighting of certain content areas.

5.4 Future Research

This study takes a broad look at how to tailor modular guided tours. As a result, there are many opportunities for more focused follow-up studies on specific components of the tour. For example, researchers could create and test modules designed after various teaching and cognitive principles; quantify interactivity (physical and conversational); examine how schools can extend field-trip learning with

pre/post classroom activities; or analyze guide delivery in detail, including the use of high-arousal language.

It would also be valuable to interview more visitors to deepen the visitor perspective and target the needs of specific demographics (e.g., healthcare workers, public authorities, company collaborators). Finally, applying the same modular-tour concept in other contexts – such as a different country or industry – could further add to the understanding of how to optimize such tours in various contexts and for various audiences.

6

Conclusion

This study aimed to identify key factors to tailoring modular scientific guided tours. First, we clarified how employee guides deliver and tailor a modular scientific tour in an industry setting, and how tailoring should vary by audience. This study also shows that visitors' desire for authenticity can be met not only by seeing labs, but also by revealing the full variety of roles, workflows, and collaborations behind the science – delivered through calibrated storytelling, dialogue, and well-chosen interactivity. Moreover, this thesis presented a concise synthesis of the relevant theory and prior research on this topic, a niche area of for which we identified limited existing literary coverage.

There are several factors to consider when organizing visits for a diverse audience. It requires three linked steps: clarify the purpose of the visit and visitors' prior knowledge; place the group in an appropriate audience segment; and match them with a guide whose expertise and delivery align with what the group hopes to gain. If time gets tight, prioritize modules and transitions that best serve those aims.

During the organization phase, knowledge of the visitor purpose is also imperative. From the results of *research question 1* (regarding different visitor purposes) it can be concluded that students – both upper-secondary and university – come for an authentic sense of the workplace and to understand what it is like to work at AstraZeneca. University groups additionally expect clearer links to their course content. Business visitors primarily seek relationship-building and a concise understanding of the site and drug-development operations as context for their meetings. Across audiences, meeting employees and hearing their stories is consistently valued and it shapes the take-home messages.

Research question 2 concerns the tailoring done to meet these visitor expectations, both during the organizing phase and throughout the tour. During the tour, using employees as guides in an industry setting works best when guides: identify the group's purpose, background, and interests; adjust language, tone, and depth accordingly; and create an open, approachable atmosphere for questions. Employee guides can also serve as role-models to strengthen science identity; when guides share brief, relatable career stories that show resilience and clear pathways, visitors find the content relevant and feel they could belong in the same spaces.

For student groups, teachers can take initiative to enhance the experience and learning with their own preparations. To close the loop of experiential learning (Kolb,

1984), teachers can prepare students (with purpose, focus questions, and links to prior lessons), ask questions during the tour to signal to students that all questions are welcome, and debrief afterward to reflect on observations and feelings. Additionally, the teacher can plan later curricular references to the visit (e.g., in organic chemistry) to help students anchor new theory to a concrete experience.

Regarding *research question 3*'s focus on visitor-module and visitor-guide interactions, dialogue with guides helps visitors engage, and early low-threshold prompts and show-of-hands questions can help prime dialogue. Because cognitive load (Sweller et al., 2011) can rise quickly if too much information is presented at once, guides should connect new ideas to visitors' prior knowledge, pace information, and use the transition time for visitors to reflect briefly, or interact with peers or the modules. Moreover, appropriately paced interactive modules that link hands-on actions to the underlying scientific ideas has been seen support understanding and memory (Allen, 2004), provided they are designed to be accessible to the entire group.

In summary, understand the purpose, tailor the route, let experts lead, and encourage interaction and discussion – these are the key factors in making a modular tour meaningful and leaving a lasting impression.

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A

Module Explanation

The *Amazing Journey* consists of ten modules (often comprised of several segments) that are interconnected but are also free standing enough for the guides to be able to pick and choose what modules to include depending on the group's interests and the available time. The following is a short description of each module's segments (the boldface text) and roughly what topics the available guide script suggests covering at each stop (the itemized lists). Outside of the ten modules there are some other potential add-ons not included in the script that will be described last.

A.1 Module 1 - Welcome to AstraZeneca Gothenburg

Gothenburg Video: A short video (about 30 seconds) about AstraZeneca's ambition and purpose showed on a large led screen (Figure A.1).

Site model: A scale model of the Gothenburg site protected within a glass case (Figure A.2).

- AstraZeneca globally - site locations, number of employees, purpose and strategy
- AstraZeneca Gothenburg - the site's importance, diversity, statistics, buildings' functions and changes to the site
- AstraZeneca Sweden - short about the other swedish sites

BioVentureHub screen: Screens explaining the BioVentureHub project and displaying current companies that are part of it (Figure A.3).

- Collaboration with other companies

Molecular models: Spaced along the path of the *Amazing Journey* are large molecular models made of glass that shows the structure of various active substances developed by AstraZeneca (Figure A.4).

- Drug use, name of active substance and corresponding brand name.
- Molecule models and what the colors represents.

A. Module Explanation



Figure A.1: Module 1 - Large video screen in entrance hall.



Figure A.2: Module 1 - Scale model of Gothenburg site.

A. Module Explanation

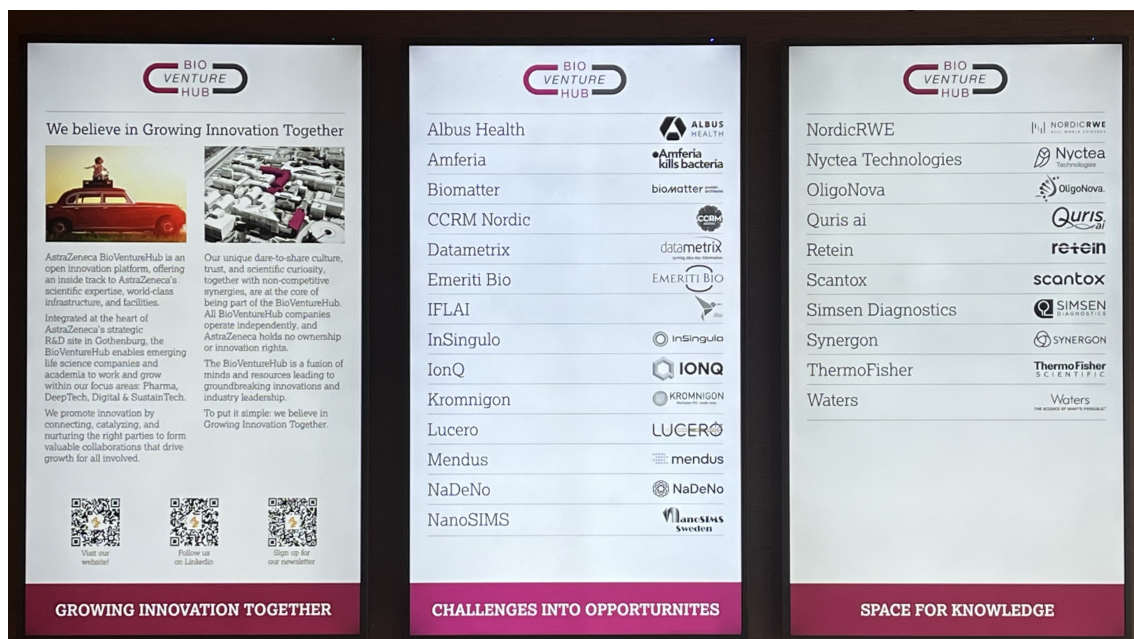


Figure A.3: Module 1 - BioVentureHub screen (note that companies change over time, this photo was taken 2026-02-10).



Figure A.4: Module 1 - One of the molecular models of AstraZeneca drugs made out of hand blown glass. Information placard in bottom right.

A.2 Module 2 - Our History

Six important inventions: Small displays of five drugs (lidocaine, tamoxifen, metoprolol, budesonide and omeprazole) and one medical device (Turbuhaler) that have all been important to AstraZenecas history (Figure A.5).

- Drug/device functionality, use cases and importance - historical and present
- Discovery process and related anecdotes



Figure A.5: Module 2 - Six important drug inventions.

Site timeline: A timeline of the site's history including company mergers, employee statistics, and launch dates for important drugs (Figure A.6).

- Site growth
- Collaboration and passionate scientists



Figure A.6: Module 2 - Site timeline.

A.3 Module 3 - Our Therapy Areas

World Health Organization display: Interactive display screen that shows statistics for reasons of death by selecting gender, region and age. Statistics come from the WHO mortality database (Figure A.7).

- Prevalence of different diseases and how that informs AstraZeneca's research focus areas

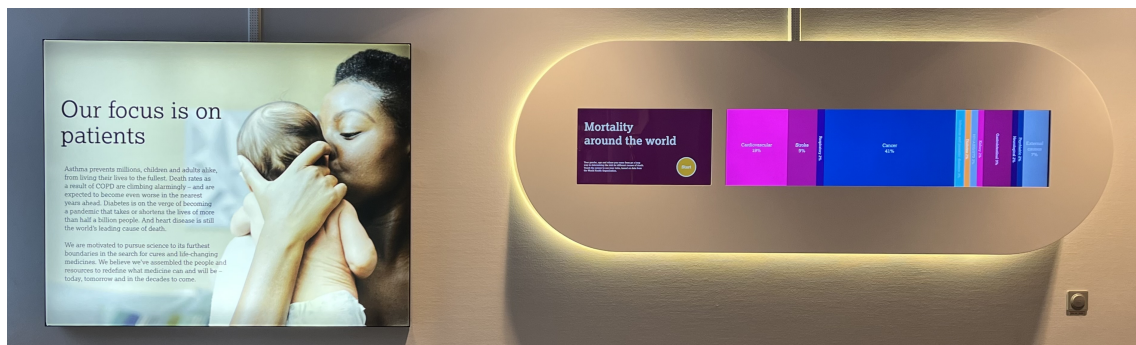


Figure A.7: Module 3 - World mortality module.

Oncology: Illuminated display with short informative text, artwork, and a screen showing cell division (Figure A.8).

- Areas of cancer research
- Technologies and scientific platforms for doing the research

Cardiovascular, Renal and Metabolism: Illuminated display with short informative text, artwork, and a screen showing an ECG readout example. Interactive heart display that through sound and vibration illustrate heart failure (Figure A.9).

- Treating symptom or underlying cause
- Historical and current focuses

- The effects of heart failure



Figure A.8: Module 3 - Therapy area oncology

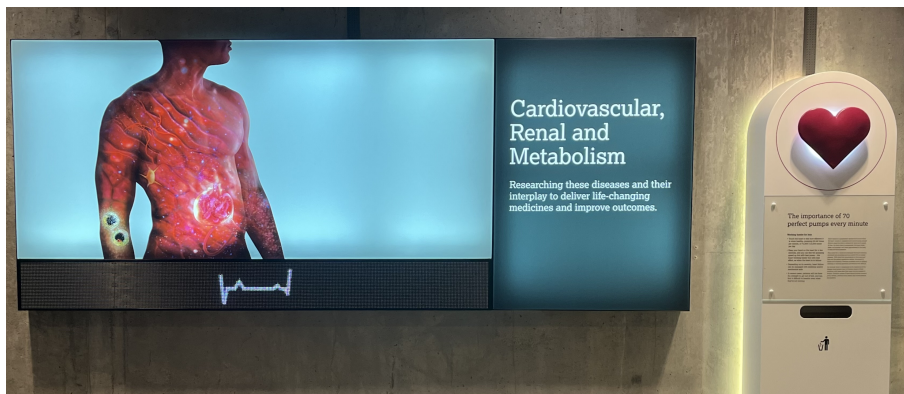


Figure A.9: Module 3 - Therapy area cardiovascular, renal and metabolism, with the beating heart display on the top right.

Respiratory and Immunology: Illuminated display with short informative text, artwork, and a screen showing a sphere expanding and contracting in a breathing rhythm. Interactive demonstration of decreased lung function by having visitors breathe through a straw (Figure A.10).

- Treating symptom or underlying cause
- Precision medicine, disease modification and clinical remission
- The experience of living with lung diseases

Rare Diseases, and Vaccines and Immune Therapies: Two illuminated displays with short informative text and corresponding artwork (Figure A.11).

- Collaboration with the COVID-19 vaccine and it's impact
- Company merges
- Statistics around rare diseases



Figure A.10: Module 3 - Therapy area respiratory and immunology, with the 'straw' activity on the bottom right.



Figure A.11: Module 3 - Therapy areas vaccines, immune therapies and rare diseases.

A.4 Module 4 - Molecular World

Video of Molecular world: A looping video showing artistic renditions of various processes that happens in the human body on a molecular and cellular level (Figure A.12).

- Explaining the imagery
- How much about the body that is yet to be discovered
- Use of AI in drug development

A.5 Module 5 - Welcome to Our Labs

High-throughput screening: Text and image showing a HTS robotic arm. Reaction speed game where one can compete against the HTS in a whack-a-mole style game. Wall mounted examples of assay trays with various numbers of wells (Figure A.13 and A.14).



Figure A.12: Module 4 - Artistically imagined visualizations of molecular processes, in video form, projected on curved walls.

- The process of finding and whittling down drug candidates
- The importance of machines to aid the work



Figure A.13: Module 5 - HTS video, assay trays, drug structure and X-ray crystallography imaging.

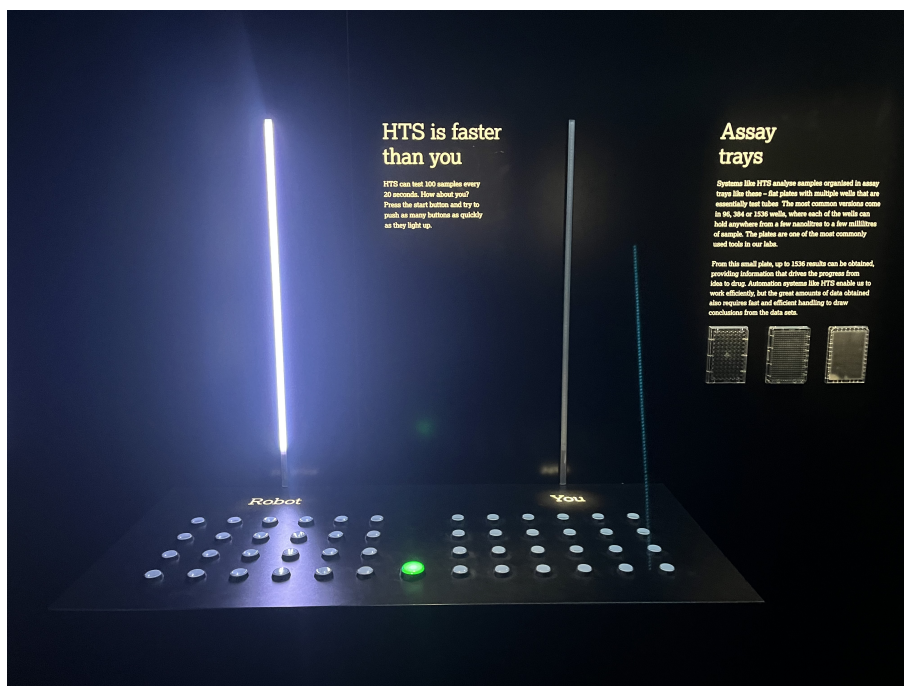


Figure A.14: Module 5 - 'Whack-a-mole' game competing against HTS robot and wall mounted assay trays.

Structure based drug design: Image of the MAX IV laboratory in Lund (electron accelerator) surrounded by a lighting display. The lights appear as being “shot” from a point and then curving around the image. Text about x-ray crystallography and images of four crystal structures. Rotating 3D computer model of a protein structure with drug molecule attached (Figure A.13).

- How visualizations of protein-drug interactions are created using X-rays

Confirming molecular structure: Text and graphs about Nuclear Magnetic Resonance (NMR) and nanoSIMS. An example NMR machine with a quarter cut out to show cross section, different parts of the machine lights up with the press of buttons (Figure A.15).

- How NMR functions and gives molecular structure
- NanoSIMS and Acoustic Mass Spectrometer uses

Drug delivery: Text and a mannequin with organs projected on it. At the press of a button various drug delivery mechanisms (tablet, subcutaneous implant, etc.) is displayed and shows the drug distribution in the body (Figure A.15).

- Different ways of drug delivery, their uses, benefits and drawbacks

Lab films: Short videos about various parts of the work at AstraZeneca. (The following topics are videos, not talking points)

- A Day in the Life of a Scientist
- Bioscience lab

- Transgenic and Precise Genome Editing Lab (CRISPR)
- Advanced cell lab
- Formulation and Device Characterization Lab
- Clinical Trials Manufacturing



Figure A.15: Module 5 - NMR (Nuclear Magnetic Resonance) cross-section and drug delivery mechanism display.

A.6 Module 6 - Sustainability

Sustainability pillars: A wheel of the three sustainability pillars (areas) on a digital display that shows half at a time and can rotate with the press of a button (to the right in Figure A.16).

- Access to healthcare: pricing, partnerships and collaboration, preventive measures
- Environmental protection: life-cycle perspective, Ambition Zero Carbon program
- Ethics and transparency: code of ethics and values, inclusion and diversity, employee well-being

Zero carbon screens: A digital display with three options of image and text segments. Rotates through the three options but can also be toggled with buttons (to the left in Figure A.16).

- AstraZeneca Gothenburg's CO₂ emission reduction over time

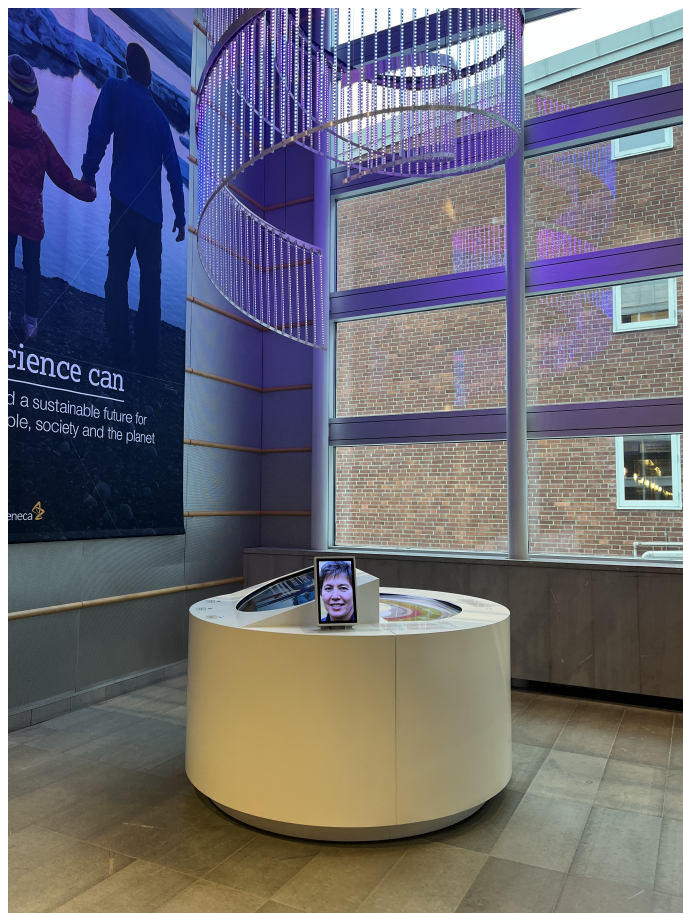


Figure A.16: Module 6 - Sustainability module (white round table) and sound activated α -helix up top.

- AstraZeneca global's CO₂ emission reduction over time
- Pharma CO₂ emissions - Climate change's health impacts and outside collaborations regarding emissions

Sustainability beyond the obvious: Screen showing AI generated faces of people of various ethnicities, gender, etc. (middle of Figure A.16).

- Inclusion and diversity
- Representation of race and minority groups in clinical trials

A.7 Module 7 - A Great Place to Work

α -helix: A large α -helix (about 2m across) made of light up rods that activate with sound (top of Figure A.16).

- The importance of activity and collaboration

Sustainability wall: Wall display partly covered in live moss and with various displays showcasing current local initiatives for sustainability that can be contributed

to by employees (Figure A.17).

- Local sustainability efforts
- Culture of activities, spontaneous meetings and collaboration
- The *Coffee Lab* (cafe and comfortable sitting area) as a place to facilitate interpersonal exchange



Figure A.17: Module 7 - Sustainability wall.

Bubblan: A place to sit down across from the IT help desk (Figure A.18). Sometimes used for a sit down discussion to end the tour if following models are not used.

- Social responsibility commitment and partnerships for local community impact
- The various people and roles that exist at AstraZeneca
- Employee resource groups, and inclusion and diversity initiatives

A.8 Module 8 - From Idea to Patient

Drug development from start to finish: Text and a digital display showing the different phases of drug development including estimated times of the various



Figure A.18: Module 7 - Seating area in bubblan.

phases. Navigation made through rotating a dial (Figure A.19).

- Time, cost and stages of drug development
- Importance of failure



Figure A.19: Module 8 - Idea to patient wheel, turn the knob to cycle through the different phases of drug development.

Bold ambition 2030: Wall mounted circles, some filled in with name and image of finished drugs (Figure A.20).

- The Bold Ambition - goal to discover 20 new medicines by 2030



Figure A.20: Module 8 - Bold Ambition display of newly discovered drugs.

A.9 Module 9 - Patents

Navigate patents: A circular digital display showing nodes in space representing AstraZeneca's different patents. Can be navigated through using buttons and a joystick to show patent number, time left and general information (Figure A.21).

- How patents work and their importance

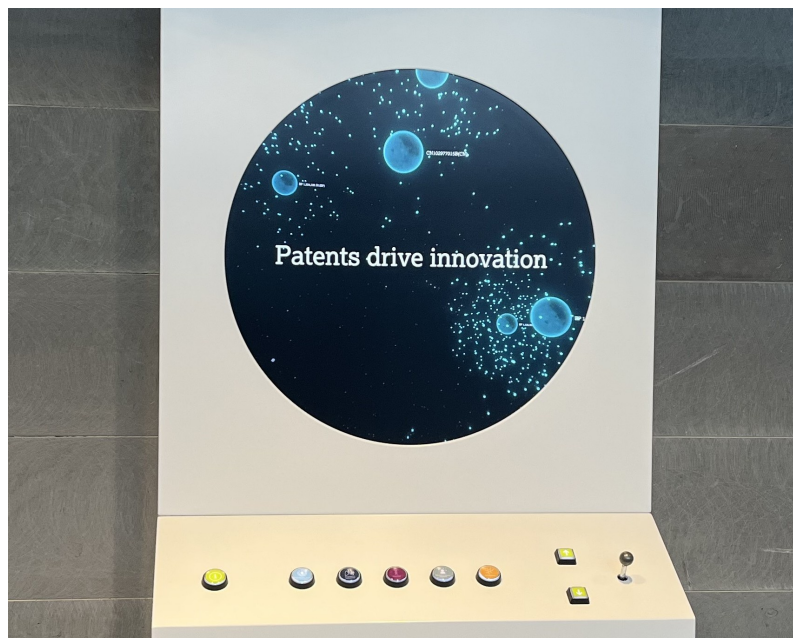


Figure A.21: Module 9 - Patent display navigated through joystick and buttons.

A.10 Module 10 - Creating the Future of Healthcare Together

Life science collaboration: A scale model of the site from 2018 with additions in pink and orange of potential new buildings, for example current GoCo complex (Figure A.22). A large screen navigated through a smaller one with bits of information regarding various collaborations (Figure A.23).

- Collaborations with other companies, and creating a life science ecosystem (BioVentureHub, Evinova, GoCo, etc.)

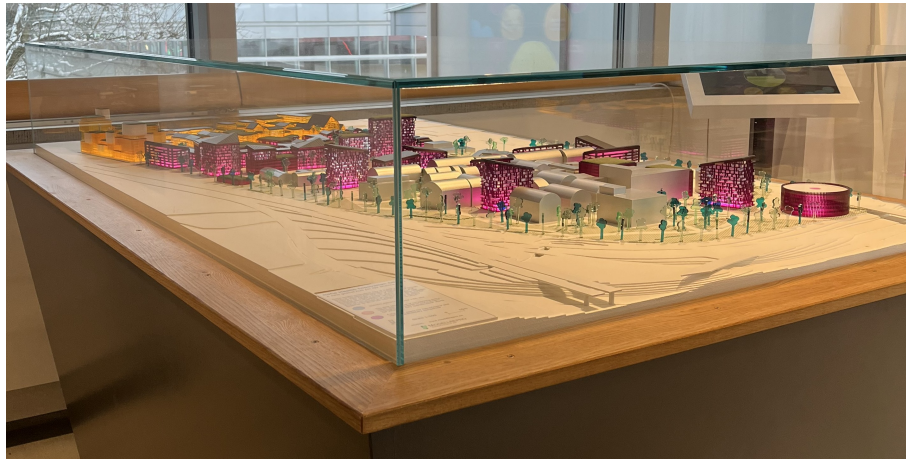


Figure A.22: Module 10 - Scale model of what was imagined to be the future of the sight 2018.



Figure A.23: Module 10 - Screen of collaborations navigated through smaller screen in bottom left of image.

A.11 Add-ons

Cell lab showcase corridor: A linear walkthrough corridor with windows that lets visitors observe selected lab processes and equipment in context without entering controlled lab spaces.

Manufacturing showcase corridor: A guided walkthrough that exposes visitors to real manufacturing environments and machines for tableting for the clinical trials.

Publications wall: Display of current research publications at AstraZeneca located between module 8 and 9.

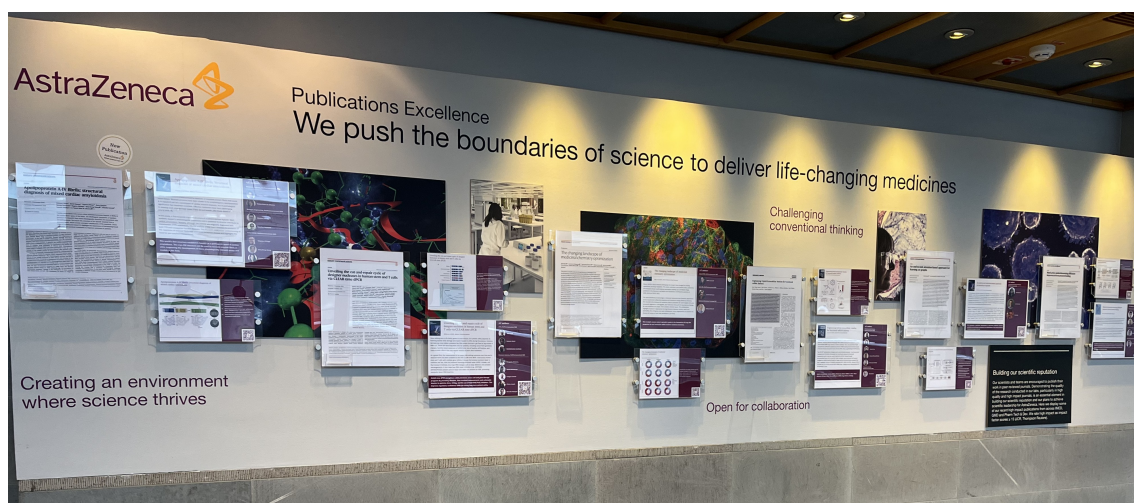


Figure A.24: Add on - Wall with display of recent publications.

B

Observation Template

B.1 Version 1

General info

Date:

Observer:

Guide/guides area of work and other relevant competence:

Group:

Number of visitors:

Length of visit:

General impression and summary of visit:

Module X: Name (same structure for all modules)

Time at module:

Content/focus/topics covered:

Questions: (number and regarding what)

Other comments (space at module, disturbances, laughter, physical engagement with modules, etc):

Questions for the guide:

What worked well? Did you experience any difficulties with the tour? Why?

How did you pick what modules to include? Do you think the choice worked well to cater to the group's specific interests?

What was the aim of the tour? What parts of AZ did you want to focus on?

Do you have previous experience guiding AJ-tours? If yes, is there a particular type of group you often take care of?

What preparations did you do previous to the visit? (Coordination efforts, planning, read the script, etc)

B.2 Version 2

General info

Date:

Observer:

Guide/guides area of work and other relevant competence:

Group:

Number of visitors:

Length of visit:

Tour route notes:

General impression (guide style, storytelling, overall visitor engagement, role model, etc):

Expressed by guide (tailoring, preparations, etc):

Expressed by visitor (purpose of visit, interest areas, etc):

Special issue to investigate further:

Questions from the guide:

Questions from the visitors:

General notes on discussion/dialogue (walktime 1:1, opens for questions, visitor-visitor discussion, etc):

Use of humor:

Visitor physical engagement with modules:

Disturbances:

C

Interview Template

This chapter presents the interview templates in English (a Swedish version was also available). It begins with the teacher interview templates, followed by the template used with AstraZeneca internal stakeholders and guides.

C.1 Interview Questions for Teachers - English

Information

We are conducting this interview as part of our master's thesis at Chalmers in collaboration with AstraZeneca. The purpose is to understand what makes tours at pharmaceutical organizations — especially the Amazing Journey — engaging, impactful, and educational. Your experiences help both our study and the development of future visits.

You have previously received and signed a GDPR form. Do you have any questions about it, the data management, or how your answers will be used?

Do you have any other questions before we begin?

START RECORDING

Background

- Tell us more about yourself and your group.
- What do you think the group's prior knowledge and perceptions are about AstraZeneca and their work?
 - Did you prepare the group in any way before the visit?
 - Did you connect back to the visit afterwards?

Purpose of the visit

- What was the goal of your visit to AZ?
- Why choose AstraZeneca specifically?
- Do you have prior experience of Amazing Journey? (Tell us about it. How did the visits differ?)

- What information about AZ do you think is relevant for your group to hear? What do you feel your students appreciate most listening to?
- Rank which of the following content areas you think are most important for your group to hear about:
 - AstraZeneca’s vision and objectives
 - What it is like to work at AstraZeneca
 - The research, technology, and science they use
 - Facts about drug development and the benefits for patients
 - AstraZeneca Gothenburg’s history
- Can you give an explanation as to the placement of the top two and the bottom one?
- (Do you think the visit increased the group’s interest in STEM?)

General impressions

- If they recently did AJ: How engaged did you perceive the group to be during the visit? In what ways was that noticeable? How did you see it?
- What did you and the group take away from the visit?
- Mention three concrete things you remember.
- Did any module stand out as particularly good? Why?
- (Have you followed up on the visit to AstraZeneca afterwards? What have you discussed?)

Design questions

- Did you feel that the content and setup were tailored to the group? In what way? Please explain.
- Do you think the design of AJ suited what you wanted to get out of it?
- Some design factors:
 - Did the guides have the right competence to meet your needs? Do you think they are good at conveying the content in an easy-to-understand and engaging way?
 - Did the sequence of modules feel logical/coherent?
 - How large was your group? Do you think your group size is suitable for getting as much as possible out of the tour? Why do you think that?
 - Was an appropriate amount of time spent on the different modules? Was there any you would have liked to see more of or, conversely, less of? How was the overall duration of the tour?

- Are you satisfied with the degree of interactivity? (Give an example of an interactive element you appreciated. Preferably also a suggestion for an element you would have liked to see added.)
- What are your thoughts on the opportunities given to ask questions and receive answers?

Conclusion

Finally, is there anything else you are thinking about that we haven't asked?

C.2 Interview Questions for Guides - English

Information

We are conducting this interview as part of our master's thesis at Chalmers in collaboration with AstraZeneca. The purpose is to understand what makes tours at pharmaceutical organizations—especially The Amazing Journey—engaging, impactful, and educational. Your experiences help both our study and the development of future visits.

You have previously received and signed a GDPR form. Do you have any questions about it, data management, or how your answers will be used?

Do you have any other questions before we begin?

START RECORDING

Background

- Briefly describe your role at AZ and your expertise.
- How often would you estimate that you guide AJ? (Have you guided more than 10 in total?)
- Do you usually handle certain types of groups? Which?
- Why do you think they want to visit AstraZeneca specifically?

Purpose

- What would you say is the purpose of AJ? What do you think it can be used for and contribute to the site?
- What image of AZ do you want to convey when you lead a group through AJ? Does it vary depending on the group?
- Rank which of the following you think is most important for your usual groups to hear about: (Please explain any differences between different types of groups)
 - AstraZeneca's vision and objectives
 - What it is like to work at AZ
 - The research, technology, and science you use
 - Facts about drug development and the benefits for patients
 - AstraZeneca Gothenburg's history
- Can you explain your reasoning for the placement of the top two and the bottom one?
- Before you go to guide a group, what kind of experience do you want to give them? Does it differ depending on the type of group?

Adaptations

- What adaptations or modifications do you usually make to meet different needs/interests from different groups?
- Do you receive any instructions on how they want it to be? Do you usually get requests in advance about what they want to know?
- Do you make any adaptations in the following areas:
 - How do you usually think about group size? What is a suitable group size? Do you think it varies depending on the types of people in the group?
 - How do you adapt the tour in terms of time? Are there parts where you know you want to spend more or less time?
 - If you do the tour with another guide, do you choose that person and if so, how? Do you coordinate in any way before the tour? For example, by deciding who talks about which parts.
 - How do you choose which modules to include and what you talk about at the different modules?
 - Do you often skip any module or modules intentionally? Which and why?
 - Do you try to create a link/coherence between the modules? In what way?
 - How much do you consider and adapt to the group's prior knowledge? For example, when it comes to scientific concepts, relevant examples, and so on.
 - Do you try to create interaction between you and the visitors or between visitors in any way? How? Do you usually pause to give them the opportunity to ask questions? Do you like the interactive modules?

Conclusion

(Lastly, would you describe your AstraZeneca Gothenburg in three words.)

Is there anything else you are thinking about that we haven't asked?

D

Visitor Survey

This chapter presents the visitor survey questions in English (a Swedish version was also available). The questionnaire was organized into three blocks (information and consent, practical details and content), and they are shown on the following pages.

Visitor feedback survey

This survey collects data for a study conducted by Chalmers and AstraZeneca which aims to study success factors for guided tours of pharmaceutical organizations. Your answers will also help to improve The Amazing Journey for future visitors.

* Required

Consent to data-collection

By leaving your **anonymous** answers here you consent for them to be stored until August 31 2026 and used in the report that will be published by Chalmers. The results of the survey will also be shared with AstraZeneca to continue the work of improving the visitor experience.

I consent to my answers being used for the above mentioned study and to be able to improve The Amazing Journey. *

☐ I agree

Practical details of the tour

Which target group do you belong to? *

- ☐ Upper secondary school
- ☐ Folk high school
- ☐ University student
- ☐ AstraZeneca employee
- ☐ Researcher in pharma, chemistry, biochemistry, biotechnology or similar
- ☐ Researcher within another field
- ☐ Authority
- ☐ Interest group (gardening association, STF - Swedish Tourist Organization, etc)
- ☐ Company representative
- ☐ Family or friend

How would you rate your overall experience with the tour on a scale of 1-6? *



What did you **like** about the tour? *

What did you **not like** about the tour? *

Rate the following factors on how important you believe they are for your experience of a guided tour like The Amazing Journey. *

	Not very important	Somewhat important	Important	Very important	Crucial
The guides' knowledge	☐	☐	☐	☐	☐
The guides' delivery	☐	☐	☐	☐	☐
The ability to ask questions	☐	☐	☐	☐	☐
Easy to understand-content	☐	☐	☐	☐	☐
New insights about AstraZeneca	☐	☐	☐	☐	☐
Small group size	☐	☐	☐	☐	☐
Interactivity in the modules	☐	☐	☐	☐	☐
Visually impressive modules	☐	☐	☐	☐	☐
The tour following a clear order	☐	☐	☐	☐	☐

Was there any other important factor/factors that impacted your experience that wasn't mentioned above?

Content and Takeaway Insights

What part of what you learned today had the biggest impact on you? *

What did you think was most interesting to hear about? Rate the answers from most to least interesting. *

AstraZeneca Gothenburg's history

Facts about developed drugs and the use for patients

AstraZenecas vision and goals

How is it to work at AstraZeneca Gothenburg

The research, technology and science they are using

Did the content of the tour match your expectations? If not, what would you have liked to see more of? *

Is there anything else you want to comment on?

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