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Design lecturers' pedagogical approach to practical studio sessions during the rapid transition to online learning

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Abstract

Design education revolves around the effectiveness of face-to-face interactions in the design studio for design pedagogy to be effective (Hammershaimb 2018). During the COVID-19 pandemic restrictions in South Africa in 2020, design-specialised lecturers had to rapidly transition their practical-orientated contact classes to online classes. Design education lecturers had to come to terms with students distanced from themselves, the institutional studio, and their peers. Lecturers had to rethink their pedagogical choices while preserving their programmes' academic integrity. This qualitative study focused on design lecturers' approach to facilitating the sudden change from contact-orientated classes to online classes for first-year Bachelor of Design students whose exposure to design education was little to none. This descriptive case study adopted an interpretivist stance and used the Cognitive Apprenticeship Model (CAM) as a theoretical framework to guide the analysis of data derived from five education design lecturers' semi-structured interviews and a focus group interview. This study does not establish the effectiveness or success of these design lecturers' pedagogical approaches; however, it clearly describes how design lecturers were able to conduct their studio classes in the online environment with a combination of various CAM methods.

Findings indicate that lecturers were familiar with and applied modelling, coaching, scaffolding, and exploration in their studio pedagogy. However, they were not clear on the distinction between reflection and articulation, and as a result, these methods were underutilised. These findings add to the debate on whether design education is over-reliant on physical studio-related pedagogies and whether pedagogies suited for the online environment can be equally effective. Therefore, future studies could further investigate the effectiveness of these design lecturers' pedagogical approaches, their use of Information and Communication Technologies to mediate practical design sessions, and what these practices mean for future design educational practices in South Africa.

Keywords: COVID-19, Cognitive Apprenticeship Model, design studio pedagogy, education design, online pedagogy.

Introduction

The core of Design Education centres around the effectiveness of face-to-face interactions within the design studio *(Hammershaimb* 20*18)*. However, what happens when it is not possible to have in-person studio interactions, and design needs to be taught online? How do lecturers accommodate and

support design students to achieve learning outcomes in this sudden shift to an unfamiliar online environment? During the COVID-19 pandemic restrictions in 2020, specialised design lecturers had to rapidly transition their practical face-to-face contact classes to an online mode of delivery. In this rapid shift to online learning, design lecturers experienced what Toom (2006) refers to as pedagogical moments. They had to make decisions that upheld their vision of an effective learning experience and in their reconceptualisation of these practical studio sessions, considering that students were physically distant from one another, the studio, and the lecturer.

The aim of this study was to describe design lecturers' pedagogical decision-making in an unfamiliar online environment and further describe these approaches through the lens of the Cognitive Apprenticeship Model (CAM) and the existing theory on design education.

Educational practices in design education

Design Education is rooted in the practice-based approach to teaching and learning and typically involves applying creative problem solving within the physical environment of the design studio (Shao et al. 2009; Hammershaimb 2018). A practice-based curriculum requires students to actively acquire applied knowledge while continuously reflecting on the outcomes of their experiential learning (Daalhuizen & Schoormans 2018; Dorst & Reymen 2004).

Donald Schön (1987) introduced the cognitive design theory, emphasising that essential design concepts can only be understood in the context of practical engagement (Logan 2008; Visser 2011). Schön's theories on design pedagogy have greatly influenced effective teaching methods in design. His concepts of reflection-in-action and knowing-in-action form the foundation of the design process, where students question and challenge problems in real-life situations, engaging in a *"reflective dialogue with the designer's own knowing-in-action"* (Broadfoot & Bennett 2003, p. 3). As students *do* design, they engage in thinking, and this interplay between action and reflection enhances their learning process (Visser 2011). Through this process, students develop self-reflective and critical thinking skills, reframing problems and solutions (Khan & Botes 2017).

To foster critical thinking, Kvan (2001) suggested a shift in design education from a focus solely on the final product to a focus on the design process. This shift encouraged students to deliberate on their learning experiences whilst reviewing and evaluating their progress (Shao et al. 2009). Deliberation occurs when students step back from their design work to reflect on their experiences, methods, and outcomes to discover new possibilities for action that may not have been apparent (Broadfoot & Bennett 2003). Moreover, students engage in deliberation when their solutions to design problems are critiqued by lecturers, peers, and themselves, fostering a constant questioning of methods and seeking improved solutions. Ongoing discussions and feedback are crucial for students to reflect on multiple potential outcomes and solutions (Hammershaimb 2018; Logan 2008; Sharma et al. 2020).

The literature on design education highlights four criteria for effective design studio pedagogy (Kvan 2001; Moss & Edmonds 2008; Shao et al. 2009):

1. The central concept should be "learning-by-doing", as the core principles of design can only be truly understood within the context of practical engagement.
2. Tacit knowledge should be actively experienced through dialogue between students and lecturers. This dialogue occurs as students engage in the design process, involving articulation, reflection, and critique, whether in face-to-face or online interactions.
3. Design pedagogy should foster a collaborative environment, allowing students to build trust, rely on one another, and develop teamwork skills.

4. The focus should be on the design process rather than solely on the final outcome, emphasising deliberation and reflection as integral parts of the design journey.

The acquisition of design skills has traditionally been associated with apprenticeship learning methods, where experts guide and transfer practical skill sets to novices (Kocadere & Ozgen 2012). In this approach, learning progresses from observing experts to receiving coaching and eventually applying knowledge and skills independently (Oriol et al. 2010).

One prominent framework that aligns with design education is the Cognitive Apprenticeship Model (CAM). While incorporating some elements of traditional apprenticeship, the CAM primarily focuses on developing students' cognitive and metacognitive knowledge rather than solely emphasising physical skills (Collins & Kapur 2014; Oriol et al. 2010). In the context of design education, the CAM aligns with pedagogy that promotes effective learning through experiences guided by a master practitioner (Adams et al. 2016). Cognitive apprenticeship is rooted in theories of situated cognition, which view knowing and doing as inseparable (García-Cabrero et al. 2018), connecting back to Schön's theory of reflective practice within the design studio. According to Schön (1987), design knowledge is acquired by observing and practising design while articulating and reflecting on the experience. Schön emphasises that tacit knowledge must be made explicit to share design knowledge (Logan 2008), which aligns with Cognitive Apprenticeship Model's methods. There are six methods that constitute the core of the Cognitive Apprenticeship Model in design education. These methods are depicted in Figure 1.
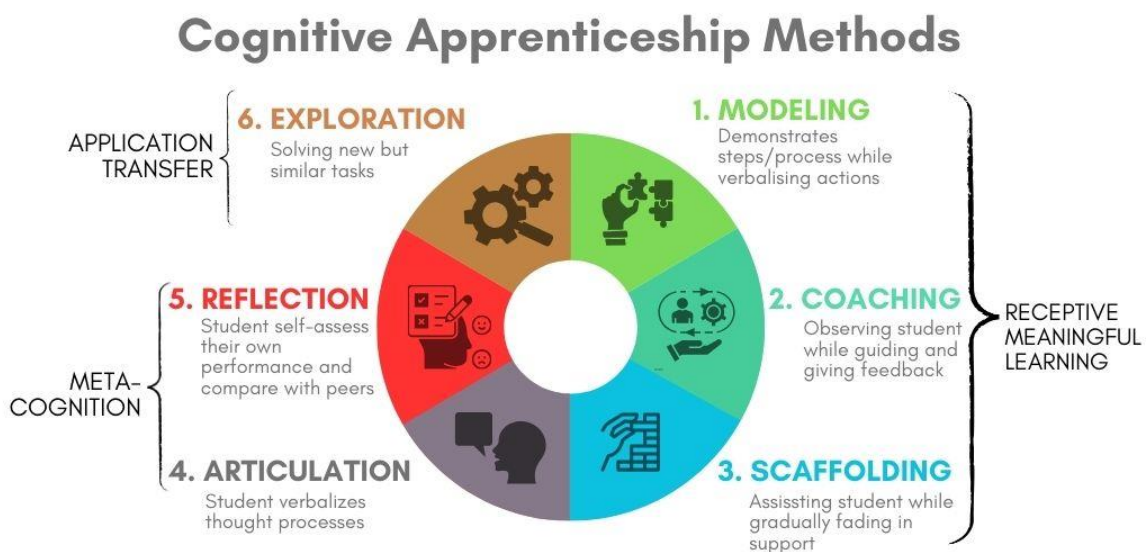

Figure 1: Cognitive Apprenticeship Model's six methods adapted from Seel et al. (2000)

Design lecturers naturally draw upon CAM methods, as they themselves were taught in a master-to-apprentice manner and understand the process of learning to design (Adams et al. 2016). Daly et al. (2019) and Walker (2019) describe how lecturers employ CAM techniques and explain that design lecturers inherently tacitly apply these. Even if they are unaware of the formal framework, design lecturers implement these methods by making their design knowledge visible, continuously demonstrating their design thinking to students, sharing their accumulated experience, knowledge, and belief systems, and guiding students to understand design.

Research method

This study was conducted at a private higher education institute (PHEI) specialising in design-orientated programmes. This PHEI has five campuses across South Africa. The data were primarily collected at the Pretoria campus. Each student is equipped with a laptop with all software needed, on-campus WiFi and access to the learner management system (LMS), where all their courseware is digitally available. The campus has a range of studios that are equipped with devices (desktop), projectors, and WiFi. Specific tools and specialised equipment are also available for the lecturer and students to use in these studios.

The lecturers are all from the industry and practising designers in their fields. They receive training in teaching and learning methods focused on blended learning throughout the year; however, the mode of instruction before the COVID-19 pandemic was primarily in contact-based studio settings where studio pedagogy is the primary teaching and learning methodology in design education and their experience and training in online teaching and learning were very limited to none at all. Five lecturers were selected via purposive sampling. The inclusion criteria focused on design lecturers who previously taught practical design sessions using face-to-face studio pedagogy and were teaching first-year students in a design degree programme.

The lecturers were interviewed after a year of teaching in the online environment and could describe their pedagogical approaches and experience in the online environment in depth by referencing concrete examples. The individual meetings were recorded in Microsoft Teams, and the researcher followed a semi-structured interview schedule based on the CAM's teaching methods. Each method was briefly explained, and then the researcher asked if the lecturer found themselves implementing this method and, if so, to elaborate on when, how, and their experience of it in the online environment. The individual interviews lasted between 45 minutes and 60 min, and the focus group interview for 90 minutes. Interview transcripts were captured and uploaded to ATLAS.ti 22.

The six methods of CAM as a deductive analysis frame were used to analyse and code the transcripts. Codes were clustered into these six themes related to the six methods. Table 1 lists the themes and associated codes (sub-themes) and their resulting groundedness referring to the number of quotes assigned to each code, i.e., the number of times the code was assigned to the data.

Table 1: Emerging themes, their codes and resulting groundedness used in this study

Themes	Codes	Groundedness
Application of Modelling	Lecturer modelling/demonstrating	26
	Online video content	14
	Challenges of online modelling	9
	Online guest speaker	5
	Students demonstrating to peers	7
	Showcasing examples and discussion	3
Application of Coaching	Peer Feedback/Sharing	22
	Formative feedback from Lecturer	18
	Coaching by guiding and hinting	12
	Coaching through further explaining/modelling	11
	Challenges Experienced with Online Coaching	10
	Scaffolding: Fading	18

Application of Scaffolding	Methods to track learner skill level	15
	Scaffolding: Adding support	11
Occurrence of Articulation	Articulating through discussion	13
	Lecture encouraging Articulation	11
	Articulating through documentation/written	9
	Articulating through demonstration	7
	Articulating through presentation	5
Occurrence of Reflection	Lecturer encouraging Reflection	9
	Reflection method – Journaling	6
	Absence of reflection	2
	Reflection method – class discussion	2
	Reflection happening spontaneously	2
Implementation of Exploration	Exploration encouraged	11
	Experience of Exploration Method	9

It is clear that the first three CAM methods – application of modelling, coaching, and scaffolding featured predominantly in the online mode of delivery. Articulation, reflection, and implementing exploration were mentioned as less often used methods in this mode.

Research ethics

The University of Johannesburg's Department of Education adheres to the required ethical clearance protocols and standards, which are successfully implemented in this study. The lecturers participating in this research must be informed of the ethical considerations to give informed consent.

The consent letter, which invites participants, informs them of the following: details about the researcher, background of the research study, the purpose, and objectives of the research, and research process. A research disclosure section follows where the nominees are further informed of the terms of commitment to complete the informed consent section. This commitment includes information on the expected outcomes, expected duration per evaluation point, as well as risks and benefits of participation. The nominees must consent to avail themselves as participants in a semi-structured interview and a focus group interview. Digital consent is requested once they have been issued with the full scope of the expectations and implications of the study.

Finding and discussion

The primary aim of this research was to describe pedagogical approaches that design lecturers used, prioritised, or preferred in practical studio sessions during the transition to online learning. Each theme is presented using their own words as they recollected and shared examples that resonate with observations from the literature.

Application of modelling

It was evident that the lecturers followed the same pedagogical approach as in a face-to-face studio setting, where students could observe modelling and engage in discussions or ask questions. The first example is where they modelled the design approaches and problem solving. L3 talked about how he

would demonstrate how to measure a live model in a drawing studio by using a pencil. He modelled this in the online space by switching on his camera and physically showing students:

> This is how you stand, this is how you hold the pencil, this is how you hold your arms straight and you kind of do the measuring and stuff like that (L3 Q20).

In another example, L4 mentioned shared:

> I have an easel here behind me as well. So when we are painting and I'm physically showing techniques, I can still switch my or turn my computer so that I can show them how to do like for example, we're busy now with doing washes or colour blocking [...] I can still demonstrate that by doing it myself (L4 Q17).

One of the lecturers would pre-record themselves and demonstrate how to do something saying:

> I would record myself doing the drawings [...] the kids said they couldn't see me or it's very laggy, so I had to kind of work through; okay, how can I get that information to them that is not being disrupted being disrupted by data or blurry images and I just ended up recording things (L3 Q20 -21).

This confirms Kvan's (2001) assertion that tacit design knowledge is compromised in online spaces, and asynchronous communication, involving asynchronous viewing of recordings and private messaging at different times, becomes the norm.

Another lecturer used previous students' work to showcase what worked and what did not, saying:

> Show past work and discuss it with the students" [...] The lecturer's goal with this was to "to have them (the students) understand why that work was successful in the way that the design problem was approached (L2 Q9).

Lecturers also encouraged students to model by demonstrating to their peers how they approached a design. In line with Pektaş (2015), peer-to-peer learning in the online environment was highly beneficial, promoting student-focused learning and effective knowledge acquisition.

Application of coaching

Lecturers employed various methods in the online environment to uphold the integrity of design pedagogy while implementing their coaching methods. They consistently provided timely feedback, hinting, and guidance on previously unreleased methods, aiming to deliver feedback in the moment, either privately or publicly, where students could hear or see the feedback on a public platform.

Lecturers applied the coaching method by guiding and hinting to remind the students of techniques and approaches when they are in the problem-solving process. Lecturers were aware of their input and that too much can cause students to imitate rather than interpret and apply it in their own way evident in the following statements:

> So maybe, initially, I've given them an idea just to explain or try and have them understand why theirs is not working, but then as the brief progressed, I've seen students just taking that concept and kind of going with it. I try and avoid that words like; I think you should [...] Because, yes, we tend to do that and then students don't really care about learning; they just want to please you to get the marks (L2 Q26)

> I show them different methods but I wouldn't like just show them one and from start to end because then I'm almost certain I'll get standardised designs (L5 Q51)

Hammershaimb (2018) reported that such behaviour is not uncommon in design studios, whether online or face-to-face, as students often prioritise pleasing the lecturer over embracing the learning

experience that critique brings to the studio environment. Lecturers observed the same phenomenon when students would share their work to show their ideas and progress as part of coaching and other students would imitate these ideas:

> I had an occasion where we did a bit more sharing, and then I ended up with eight of my eight students all having whitewashed flooring in their space (Fg Q95).

As a result, students displayed reluctance to share their work or collaborate with others. Smith (2022) confirms that this issue has long been problematic in design studios, where students are encouraged to engage with one another but often hesitate to rely on their peers due to concerns about idea theft or duplication, leading to isolated creative moments. According to the findings, the lecturers addressed this challenge by providing opportunities for students to self-assess, reflect on their work, and critique and analyse professional problem-solving approaches, both individually and concerning their peers' work. This process was intended to discourage copying and merely seek to please the lecturer, as suggested by Dutton (1987). Although the lecturers implemented these strategies, they did not seem to explicitly realise or mention the effectiveness of these measures in addressing the issue of students "stealing" ideas from their classmates.

Application of scaffolding

Scaffolding involves a lecturer providing assistance and support in tasks that students are still unfamiliar with and gradually reducing this support (fading) as students gain confidence and take on greater responsibility for their learning (Ding 2008). Based on the findings of this study, the application of scaffolding was intertwined with the modelling and coaching methods employed by these lecturers as they progressively reduced the level of support as the academic year progressed. For instance, the lecturers would extensively demonstrate each step of a design process for novice students but gradually decrease their modelling as the students gained proficiency in their work as evident from:

> In term one, they're so new to everything and it's such a daunting feeling getting an assignment and having to do something for it or having to do the research. So I'm always there with them every step of the way in term one but that starts to fade out in term two and term three where I feel like; you now know how to approach an assignment, you know how to gather information, you know how to work to come up with ideas. So I kind of let go of the reins a little bit on some of the assignments (L3 Q50).

Oriol et al. (2010) warned against excessive support as it can hinder a student's exploration and learning, whereas insufficient support can impede their progress. Therefore, scaffolding is only effective if the lecturer accurately assesses the student's skill level.

Occurrence of articulation

According to the lecturers, articulation starts with them asking their students to comment on, explain, and give their opinion on how a design problem was approached and solved.

> I do encourage my students before they even start with a brief, they need to explain verbally, and use visual examples in support what they are going to do, how are they going to approach this creative problem (L2 Q27).

The lecturers seem to prefer verbal articulation, which happens when students share their work with the class in an online class discussion, and lecturers can give direct verbal feedback in these online discussions that prompt the students to explain their choices and further articulate their methods and thinking:

> So they'll have to show me progress; what they've done, why they've done that. And then there's almost a discussion where I can give them feedback but they can also give input as to why they've made those choices, what was their thought process behind creating that image or whatever the brief is about (FG Q70).

Some lecturers asked their students to model or demonstrate design techniques or how they approached a design problem; students also articulated their knowledge.

> I started to have the students demonstrate painting and drawing or any interesting technique in class by switching on their computer (FG Q128).

According to García-Cabrero et al. (2018, p. 14), *"students need opportunities to verbalise their understanding to consolidate and expand their mental representations".* The findings revealed that lecturers understood the importance of students articulating their thinking and approaches as these lecturers created many opportunities for their students to verbalise their knowledge when asked to share their work in formative assessment.

Occurrence of reflection

While articulation and reflection are interconnected, it is important to note that articulation encompasses more than just verbalising the outcomes of reflection. There seemed to be an absence of reflection from the lecturers' point of view as they mentioned that *"this is a component that I don't do enough in my class"* (L2 Q31). However, it seems that the lecturers' understanding of what reflection entails might not be very clear as one of them admitted that *"I think reflection has been in projects, maybe I've just not realised that it is a reflection component"* (L2 Q32).

After the focus group interview, it became clear that the lecturers do not have a clear understanding of reflection and confused reflection with articulation. After listening and reading through their transcripts, I found that reflection is part of their pedagogy, even if they did not realise it. Reflection starts with the lecturer and happens mostly through lecturer encouragement, although there are some occasions where students spontaneously reflect on their learning. Lecturer 4 recalls:

> It's not like I encouraged this or initiated this, rather; somebody just spoke up and said they enjoyed that and then the rest sort of jumped in. So, some students sort of initiate things happening in class as well, or debates happening (L4 Q42).

This spontaneous sharing happens after the students have completed their assignments. In these reflections, the lecturer encourages their students to think about what they have done and the steps they took to get to their final design and reflect on their experience and what they have learned in this process. According to lecturers, reflection happens mostly in online spaces:

> A lot of students jumped onto blogs last year and this year, where they put all their process on blogs where they have research and their notes and reflections and examples of work or inspiration (FG Q194).

Students are also encouraged by their lecturers to reflect specifically on the feedback they receive after a summative assessment. This reflection method is not made mandatory but put forth as a choice to the students:

> I think it helps when I give them written feedback and then I have a conversation after that and then it gives the student the opportunity to actually reflect on what they could have done differently (FG Q73).

This distinction is evident in the findings, highlighting how the lecturers encouraged both Articulation and Reflection. Oriol et al. (2010) and Collins and Kapur (2014) elaborate on this difference, explaining

that Articulation involves students expressing their thoughts (verbally or non-verbally) during the design process, discussing their choices, while Reflection entails students looking back on their actions, verbally or non-verbally evaluating the outcomes of their choices, and considering alternative choices that might have been more effective.

García-Cabrero et al. (2018) emphasise the need for students to articulate their understanding to solidify and expand their mental representations. The findings reveal that the lecturers recognised the importance of students articulating their thinking and approaches. They provided numerous opportunities for students to verbalise their knowledge during formative assessments when sharing their work.

Regarding reflection, the findings demonstrate that the lecturers were highly aware of its significance and the role it plays in helping students make sense of their knowledge and take ownership of their learning. Collins and Kapur (2014) outline three forms of reflection:

> 1) reflecting on one's process,
> 2) comparing one's performance to that of others, and
> 3) comparing one's performance to a set of evaluation criteria.

When examining the findings, the reflection encouraged by the lecturers primarily focused on students reflecting on their own process. Reflection, as indicated in the findings, mostly occurred as part of or following summative assessments. Students would verbally reflect on their methods and outcomes during their final presentations, and there were also opportunities for verbal reflection on the feedback received from lecturers and peers.

Collins and Kapur (2014) suggest that technology can enhance reflection, enabling students to review their own work and that of others in greater detail through recordings. However, the findings did not mention the use of recorded sessions or recording functions as part of the reflection process in the lecturers' online pedagogy.

Implementation of exploration

Exploration plays a significant role within the design education studio-based culture (Tovey 2015). Lecturers recognised that exploration is best introduced later in the academic year when students have developed some skills and may feel more confident in their decision-making abilities. *"It's more in semester two that I start to let the reigns go a little bit and allow students a bit more freedom"* (L5 Q53). This aligns with Dickey's (2008) findings, which suggest that students who undergo appropriate scaffolding methods develop the skills and confidence to rely less on the lecturer and course materials, enabling them to engage in more independent exploration using external resources.

Exploration was unavoidable in the online environment; students were faced with the challenge of not having access to studio-provided resources and were forced to improvise:

> I would let's say like we were struggling with silk screening, they couldn't get the materials and then allowing them to find another solution to that problem and creating their own technique to get to the same sort of outcome and explaining that to the class (L4 Q33).

Furthermore, the lecturers felt that the online environment encouraged exploring new methods and ideas among their students as their students saw each other's work more frequently online:

> They (the students) went all out. I don't know if it was because they could see each other's work in this online platform, and they could like kind of compare it a little. I also think with the open-mindedness, if one person does something really good, it's kind of like everybody else has to do just as good.

Although the experience of exploration is mostly positive, some lecturers felt that not all students benefit from open briefs or no limits, as they might feel lost and start asking for more guidance:

> But sometimes when you give them that freedom or the chance to be as creative or self-sustainable as possible, they're like; oh, I'm so lost, I don't know where to go (FG 78).

The challenges lecturers and students faced in the online environment provided opportunities for the implementation of exploration. The literature suggests that timely implementation of exploratory practices "encourages students to advance problem-solving to the next level" (Oriol et al. 2010) and that students should be "encouraged to initiate projects, defining and exploring their own areas of interest" (Hardman 2017) to develop into successful designers.

Conclusion

By employing the Cognitive Apprenticeship Model (CAM) as a theoretical framework, this case study provided a clear and comprehensive understanding of the pedagogical approaches used by lecturers during the rapid transition to online learning during the COVID-19 pandemic. These approaches were explored in relation to existing literature and situated within the context of design education practices in both in-person and online sessions. Despite the lecturers' lack of awareness of the CAM, they inadvertently incorporated cognitive apprenticeship methods into their online teaching of practical-oriented design subjects. The findings described how lecturers effectively used information and communication technology to mediate teaching methods such as modelling, coaching, scaffolding, and exploration.

This description of design lecturers' pedagogical approach to practical studio sessions during the rapid transition to online learning calls for further investigation into the effectiveness of these approaches and their impact on student learning. In particular, lecturers did not understand the distinction between methods of articulation and reflection, and more work can be done to support lecturers in these areas in the future. These findings also raise questions about the future of design education practices as a studio-based pedagogy and the advantages and disadvantages of various modes of delivery.

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