Students' Perspectives of Dynamic Learning Pathways within Canvas

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Abstract: The adage 'one size fits all' is increasingly outdated in education. Research indicates that students learn differently and benefit from flexible, diverse, and personalised approaches. However, educators are often constrained by institutional learning management systems (LMS), while educational provision remains predominantly designed top-down. Consequently, the student voice, although critical to improving engagement, agency, and outcomes, is often underexplored in course design and evaluation. This study explores students' perceptions of two dynamic learning pathways developed within Canvas: (1) gamified pedagogy and (2) adaptive learning. Gamified pedagogy applies gaming principles to provide greater learner control, while adaptive pathways adjust content complexity and pace to individual needs. Vignette-based focus groups were conducted with 17 students from varied academic backgrounds and levels of experience, using recordings that demonstrated each pathway from a student perspective. Both approaches were perceived as innovative and engaging, although preferences varied according to interactivity, enjoyment, autonomy, and structure. Students also raised concerns about the social implications of personalised pathways, including potential embarrassment and peer judgement. Overall, the findings conceptualise engagement with dynamic LMS pathways as a Person–Environment fit phenomenon, emerging when pathway and LMS affordances align with students' preferences, motivational orientations, and desired levels of social interaction. The study highlights the importance of incorporating student perspectives into dynamic learning design while demonstrating the opportunities and challenges of implementing such pathways within existing LMS constraints.

Keywords: Dynamic Pathways, Learning Management Systems, Vignette, Focus Group, Person-Environment Fit

1. Introduction

Flexible, diverse and personalised education is deemed a powerful approach to enhancing student learning (Du Plooy et al., 2024; Ortiz-Vilchis and Ramirez-Arellano, 2023). Flexible approaches allow students to learn at different speeds and follow different routes (Barua and Lockee, 2024; Loon, 2022).. This supports progression at an individual pace and reduces dependence on a fixed learning sequence (Ovtšarenko, 2023). Diverse approaches recognise that students engage with materials, tasks, and support in different ways (Donevska-Todorova et al., 2022; Sanger, 2020). This can make learning more inclusive for students with different backgrounds and levels of readiness (Sanger, 2020). Personalised approaches adapt learning experiences to students' prior knowledge, needs, and progress (Brusilovsky, 2001; Shemshack and Spector, 2020). This can strengthen engagement and academic performance by making learning more relevant to individual students (Mikić et al., 2022; Zhong, 2023). Together, these flexible, diverse and personalised features provide the basis for dynamic learning pathways (De Smet et al., 2016; Donevska-Todorova et al., 2022; Ovtšarenko, 2023). Consequently, higher education institutions are increasingly seeking to implement dynamic learning pathways that accommodate diverse learner needs, preferences, and prior knowledge, with Learning Management Systems (LMSs) serving as the primary infrastructure for online and blended learning.

Learning Management System (LMS) first emerged in the late 1990s (Coates et al., 2005; Davis et al., 2009) and are commonplace within the educational environment nowadays. LMS are defined as digital platforms that support the delivery, management, and tracking of learning activities (Prahani et al., 2022; Coates et al., 2005). They are used to organise educational content, monitor learning activities, manage course-related processes, and support instructional and administrative tasks (Phan et al., 2022; Prahani et al., 2022). Yet, many LMS provide limited adaptive functionality (Du Plooy et al., 2024). Coates et al. (2005) argue that the educational value of LMS is determined not simply by the provision of features, but by students' uptake and meaningful use of those features. Whilst research exists which examines dynamic learning technologies (De Smet et al., 2016; Donevska-Todorova et al., 2022; Ortiz-Vilchis and Ramirez-Arellano, 2023), there is a dearth of research which explores students' perceptions of instructor-designed dynamic pathways created within standard LMS environments. Therefore, this study explores students' perceptions of two dynamic learning pathways developed within the constraints of an LMS.

2. Overview of Dynamic Pathways: Benefits and Constraints

Learning pathways are flexible routes through learning that may vary in form while leading to the same intended outcomes (Ortiz-Vilchis and Ramirez-Arellano, 2023). Gamification and personalised learning represent distinct

pathways (Du Plooy et al., 2024; Veluvali and Surisetti, 2022), enabling students to navigate content differently while working towards shared goals (De Smet et al., 2016; Ovtšarenko, 2023). However, they achieve flexibility differently: gamification restructures the experience of progression, whereas personalised learning adapts content, sequence or pace to individual learners.

Gamification is defined as the use of game design elements in non-game contexts (Huotari and Hamari, 2017; Deterding et al., 2011). In education, it can organise content around achievement, progression and social interaction through points, badges, levels and leaderboards (Majuri et al., 2018), or apply broader gaming principles across a syllabus (Fischer et al., 2016; Khaldi et al., 2023) (referred to as 'Gamified Pedagogy'). Gamification has been associated with increased engagement and motivation (Lampropoulos et al., 2025; Lampropoulos and Sidiropoulos, 2024). However, its effects are unlikely to be universal, as mechanics offering autonomy, competition, interaction and structure may appeal differently to individual students. Its value therefore depends partly on how learners perceive the experiences these features create.

Personalised learning addresses learner diversity by adapting learning experiences to individual differences. This can include adapting content, sequencing materials, supporting readiness and creating flexible pathways (Mikić et al., 2022; Zhong, 2023; Ning et al., 2025). Reported benefits include improved engagement, motivation and academic performance (Shemshack and Spector, 2020; Du Plooy et al., 2024). However, individualisation also raises questions about the levels of autonomy, structure and differentiation students prefer and how personalised pathways affect the social dimensions of learning. Their value therefore cannot be understood solely through technological capabilities or academic outcomes.

Person–Environment Fit (PEF) theory provides a theoretical lens for understanding these differing responses. PEF concerns compatibility between individuals and their environments, including complementary relationships in which individual needs are met by environmental resources (Muchinsky and Monahan, 1987). Rather than assuming that pedagogical features are inherently engaging, PEF proposes that outcomes depend on the correspondence between environmental characteristics and individuals' needs, preferences and capabilities. Research demonstrates associations between fit and individual attitudes and outcomes (Kristof-Brown et al., 2005). Applied to education, features such as autonomy, structure, interactivity, challenge and social interaction may therefore be experienced differently across students. Gamified and personalised pathways may enhance engagement when their affordances align with learner needs but become less effective when misalignment occurs.

Through this lens, gamified and personalised learning represent different mechanisms for achieving learner–environment fit. The gamified approach seeks to do so through motivation, choice, progression and interaction, while personalised pathways adapt to learning needs, readiness and pace. Their effectiveness may therefore depend on alignment with students' preferences, motivational orientations and desired levels of social interaction, shifting attention from whether these approaches are inherently effective towards for whom and under what circumstances they are valuable.

Achieving such fit is also constrained by the technological and institutional environment. Implementation may be limited by institutional structures (Lyu, 2025), technological capabilities (Du Plooy et al., 2024) and assessment requirements (Veluvali and Surisetti, 2022), while limited research has examined their systematic integration within standard LMS environments (Velarde Orozco and De Benito Crosetti, 2025). LMS platforms therefore do more than host pedagogical designs; their affordances and constraints shape the flexibility, adaptation and interaction educators can provide.

A further limitation concerns the student voice. Educational provision is often educator, or institution, led despite arguments for recognising students as active participants in shaping learning experiences (Bovill et al., 2011; Cook-Sather, 2006; Dollinger and Lodge, 2020). A gap may therefore exist between pathways that are pedagogically or technologically feasible and those students perceive as engaging and appropriate. From a PEF perspective, students' perceptions are particularly important because fit depends on how learners experience their environment.

Taken together, three gaps emerge. Gamified and personalised learning are frequently examined independently despite representing alternative approaches to dynamic learning; research has focused more on implementation than on students' perceptions of their affordances; and limited understanding exists of how these approaches are experienced within the constraints of standard LMS environments. Accordingly, this study explores students' perceptions of gamified and adaptive learning pathways designed within Canvas. Through a Person–

Environment Fit (PEF) lens, the study considers how differences in students' responses to pathway affordances shape perceived engagement.

3. Methodology

In this study, students' perceptions are explored through a vignette-based focus group approach. Vignettes were selected to represent a short, carefully constructed description of a person, object, or situation, designed to combine specific characteristics in a structured way (Atzmüller and Steiner, 2010). It presents participants with hypothetical yet realistic scenarios (Gould, 1996) that simulate aspects of real-life contexts, inviting them to respond to the situation (Shaw et al., 2003). These responses offer insight into participants' beliefs, attitudes, judgments, knowledge, or intended behaviours, and research suggests that findings derived from vignette-based methods can be comparable to those produced through more traditional approaches (Payton and Gould, 2023). More specifically, video vignettes were used as they are argued to facilitate better participant engagement (Cox et al., 2023). Ethical approval was granted from the University's Social Research Ethics Committee (details omitted for review).

In March 2026, several focus groups, lasting 30 – 50 minutes, were operationalised. The focus groups comprised a total of 17 participants, including five male and twelve female students. Participants represented a diverse range of academic disciplines, including Business Analytics, Law, History, Dentistry, Philosophy, Accounting, and other fields of study. The sample also encompassed students at different stages of higher education, including undergraduate, postgraduate, and PhD levels, thereby capturing perspectives across varying levels of academic experience. In addition, participants came from a range of national backgrounds, including Irish, Chinese, Indian, French, and Brazilian. This diversity in gender, academic discipline, level of study, and nationality contributed to a heterogeneous participant group and enabled the focus groups to capture a broad range of perspectives and experiences. After providing consent, students watched two video vignettes depicting hypothetical learning scenarios and took notes. The first demonstrated the application of gaming principles to teaching, while the second illustrated how Canvas Mastery Paths can support personalised learning. Participants were subsequently asked questions about their interpretations and expectations of the dynamic learning pathways presented.

The focus group data was subsequently transcribed and cleaned before analysing the data using Braun and Clarke (2006) thematic analysis technique. Figure 1 presents the bottom-up development of themes from the coding process. Original data extracts were first coded as first-order codes. These codes were then grouped into second-order categories and further refined into three third-order themes. The researchers independently analysed the data before collectively reviewing and refining the findings. During this process, commonalities across the individual analyses were identified and retained, while some codes were recategorized to better reflect patterns within the data and facilitate the emergence of broader themes. Any divergent interpretations or conflicting concepts were discussed collaboratively, allowing the researchers to reach consensus and strengthen the coherence and credibility of the final thematic framework.

Original data extract	Initial code	Sub–theme	Main theme	Reference
"For Video 1, I thought the flowchart was good… students can see their progress." (FG4–P3); "students only move step by step and do not know what they will have to do…" (FG8–P1)	*Advantages of gamified learning; step–by–step progression; progress visibility*	**Benefits and Limits of Gamified Pathways**	***Theme 1: Students' Different Learning Preferences and the Limits of Single Pathway Design***	12
"Everyone has different ways to learn. Some people like visual learning, some like hands–on learning, and some like reading." (FG3–P2); "I think it could become biased…" (FG2–P2)	*Necessity of personalised learning; negative effects of personalisation; bias concern*	**Benefits and Limits of Personalised Pathways**	***Theme 1: Students' Different Learning Preferences and the Limits of Single Pathway Design***	17
"I also like discussion forums because students often want to discuss submissions and ideas…" (FG2–P2); "Maybe there should also be review sessions…" (FG6–P1)	*Different needs for interaction; discussion forum; review sessions*	**Interaction: From Learning Engagement to Social Discomfort**	***Theme 2: Students' Differential Perceptions of Interaction, Autonomy and Competition as Motivational Design Features***	8
"Personally, I prefer seeing everything from the beginning instead of only step by step." (FG8–P1); "That gives structure, but also some flexibility…" (FG3–P2)	*Learner control; pathway visibility; balance between structure and flexibility*	**Autonomy: From Learner Control to Need for Structure**	***Theme 2: Students' Differential Perceptions of Interaction, Autonomy and Competition as Motivational Design Features***	24
"I also feel this would increase competitiveness among students and create feelings like: 'I'm behind everyone else.'" (FG2–P2); "For the second one, it could make students feel bad about themselves." (FG8–P1)	*Competition among students; performance pressure; reduced motivation*	**Competition: From Motivating Challenge to Performance Pressure**	***Theme 2: Students' Differential Perceptions of Interaction, Autonomy and Competition as Motivational Design Features***	3

Figure 1: Coding Structure

4. Findings

No two students are the same and our findings reflect this sentiment. Students reported both pros and cons to dynamic learning pathways. Simplicity itself was valued, with several students praising both designs for being easy to understand.

"I like that both systems are really simple and easy to understand." (FG8–P1)

"Both ways are a good way of learning" (FG5–P1)

From a gamified pedagogy (dynamic pathway #1) perspective, students found this engaging and a more structured process than personalised pathways (dynamic pathway #2)

> *"For Video 1, I thought the flowchart was good. It gave students an idea of what the outcome would be. I also thought the visual representation of the character climbing a mountain was good because students can see their progress." (FG4–P3)*

> *"The second one [video] is more customised for different people and gives the right material for different learners." (FG7–P3)*

The findings further reveal three core design features across both dynamic pathways that shaped students' perceived learning experiences and student engagement: interaction, autonomy, and competition.

4.1 Interaction: From Learning Engagement to Social Discomfort

Interaction was the feature students most consistently valued. A student in Focus Group 2 liked discussion forums precisely because students often want to talk over ideas and submissions with one another but usually end up asking the lecturer for want of a proper space to do so.

> *"I also like discussion forums because students often want to discuss submissions and ideas with each other, but usually we only ask lecturers instead of classmates because there's no proper space for discussion." (FG2–P2)*

There were strong arguments for anonymous questions, with many students reporting to refrain from answering questions due to fear of looking foolish in front of peers. In some cases, a student may feel uncomfortable being required to unmute and answer a question during a live video class. However, the same student might actively contribute through chat messages, discussion forums, or written assignments. Another student suggested review sessions where students could discuss whether their own approach was working, which links interaction to reflection rather than just talk.

> *"Maybe there should also be review sessions where students can discuss whether their learning approach is effective." (FG6–P1)*

Some students doubted that online breakout rooms and virtual chats could stand in for the real thing. While another disliked virtual chat and waiting on slow feedback, preferring to ask questions directly and face to face.

> *"I do not really like virtual chats with classmates. I prefer face-to-face chatting." (FG5–P1)*

Therefore, the findings suggests that interaction often improves when students are given multiple ways to engage rather than being forced into a single mode of interaction.

4.2 Autonomy: From Learner Control to Need for Structure

Students wanted pathways of learning to be clear, visible, and not unduly restrictive. Students leaned toward openness with guidance rather than locked content. A student in Focus Group 2 said they would mostly prefer the gamified approach as everything was unlocked. This perspective of access is also presented by a student in Focus Group 7 who framed the ideal as a system that suggests what might suit you while still releasing all three options to everyone.

> *"The system could suggest what might be better for you, while still releasing the three options to all students." (FG7–P1)*

Therefore, autonomy as part of the pathway drew some of the most divided responses in the dataset. Many students wanted real control over their learning, including the ability to see all the material in advance and plan around it. Yet few students wanted pure freedom. The more common position was a wish for structure and flexibility together, as reflected by:

> *"That gives structure, but also some flexibility in case something comes up or you are still getting used to deadlines." (FG3–P2)*

Several students admitted that, without structure, they would procrastinate. One student repeatedly stressed that students need a push, while another acknowledged they would happily put work off.

> *"There needs to be a push for students because many students procrastinate. Someone like me would love to procrastinate, so students need a push." (FG4–P2)*

Support tools mattered too with one student in Focus Group 6 found the MCQs and checklists genuinely useful because without them they would not know what they were meant to be doing. Together these comments describe a pathway that is transparent, visible, accessible, and scaffolded by simple tools like quizzes, checklists, and timely feedback. Furthermore, the sense of progression was appreciated with one student commenting:

> *"This idea of progression, being able to see where you're going and see the projection of it all, is satisfying when you're playing a video game. It is also very satisfying when you're doing well in college." (FG3–P2)*

Autonomy can support motivation when it provides genuine control, but excessive autonomy creates uncertainty, leading many students to still value deadlines, reminders, and clear guidance.

4.3 Competition: From Motivating Challenge to Performance Pressure

For some students, competition enhanced their motivation. A student in Focus Group 5 wondered whether scores would be made public, reasoning that seeing a classmate doing better could push them to score higher and treated visible competition as a spur.

> *"If scores were public, I think that would make it more competitive." (FG5–P2)*

However, the idea of competition was not positive embraced by all students. Some students felt that competition could create pressure. This concept of pressure enhanced when pathway allocation was linked to test results or performance. Students perceived that personalised pathways could lead to stigma when different pathways/routes become associated with assumptions about ability, motivation, or status;

> *"I think it could become biased. For example, in a class with people from different backgrounds or nationalities, someone who already has prior knowledge will naturally score higher. If someone doesn't, that's not their fault." (FG2–P2)*

One student suggested that personalised pathways based on results could make students feel worse:

> *"For the second one, it could make students feel bad about themselves." (FG8–P1)*

Another student stated:

> *"If someone is already behind, and they're only given videos while others get more advanced documents, that doesn't really help them catch up because they don't have access to the same material." (FG2–P1)*

Although personalisation is intended to support individual needs and preferences, students placed on certain pathways may be perceived as less capable, less ambitious, or in need of extra support. Therefore, competition should be treated carefully. It can be motivating when it feels like a challenge. However, it can become harmful when it creates pressure, comparison, or negative self-judgement.

4.4 Summary of Findings across Gamified and Personalised Learning

The comparison presented in Table 1 reinforces that neither pathway was universally preferred. Instead, students' preferences varied across the three core dimensions of interaction, autonomy, and competition, highlighting how the same pathway features can be perceived differently by individual learners.

Table 1: Findings Overview

Core Theme	Gamified Pathway	Personalised/Adaptive Pathway
Interaction	Students valued opportunities for discussion and interaction, particularly where different participation methods could be offered. However, preferences differed, with some favouring online interaction and others preferring face-to-face communication.	Personalised pathways raised concerns about discussing individual learning journeys with peers. Different pathways could make learner differences visible, potentially creating embarrassment or peer judgement.
Autonomy	Students valued the structure, visible progression and accessibility of the gamified pathway. However, they also wanted flexibility and control, favouring guidance without overly restrictive content.	Students valued the ability to receive material suited to their learning needs. However, concerns arose when the system determined access to content, with students preferring recommendations while retaining access to all materials.
Competition	Competition could motivate some students, particularly through visible scores and comparison	Performance-based pathway allocation raised stronger concerns about comparison, stigma and negative self-

Core Theme	Gamified Pathway	Personalised/Adaptive Pathway
	with peers. For others, competitive elements could create pressure or unwanted comparison.	judgement. Students worried that being allocated different materials could imply differences in ability or status.

5. Discussion

The findings demonstrate that both gamified and personalised pathways within an LMS can offer value, supporting research suggesting that dynamic learning can respond to individual learner needs and goals (Shemshack and Spector, 2020). However, neither pathway was universally preferred. Responses varied according to interaction, autonomy, structure and competition. PEF theory helps explain this variation by proposing that outcomes depend on compatibility between individuals and their environments (Muchinsky and Monahan, 1987; Kristof-Brown et al., 2005). Engagement therefore emerges when pathway affordances correspond with students' needs, preferences and ways of learning.

5.1 Interaction: Fit Between Social Affordances and Participation Preferences

Students valued opportunities to communicate and collaborate but differed in their preferred modes of interaction. Discussion forums, anonymous questions and asynchronous activities appealed to students seeking participation without the social pressure of speaking publicly, while others preferred direct, online face-to-face communication. These findings support arguments for flexible participation mechanisms (Sanger, 2020; Rose and Meyer, 2002), while demonstrating that increasing interaction does not necessarily increase engagement.

From a PEF perspective, interaction is effective when LMS social affordances correspond with students' participation preferences. The same discussion forum may provide psychological safety for one student while feeling impersonal to another. Similarly, visible interaction may encourage participation while increasing discomfort about peer judgement. Rather than prescribing one mode, educators should provide alternative participation opportunities.

5.2 Autonomy and Structure: Fit Rather Than Maximum Choice

Students valued access to materials, visible progression and control over their pathways, but did not necessarily favour unrestricted freedom. Deadlines, progress indicators, checklists and quizzes provided direction and accountability, while excessive freedom could encourage procrastination and overly restrictive pathways could diminish control. Thus, greater autonomy does not automatically increase engagement. This is consistent with Self-Determination Theory (Deci and Ryan, 2000), which identifies autonomy and competence as psychological needs, while PEF explains variation between students. Structure that supports one learner may restrict another, while autonomy that empowers one may create uncertainty for another. Effective pathways may therefore require guided autonomy, combining scaffolding with sufficient flexibility to accommodate different preferences for independence and structure.

5.3 Competition: Fit Between Gamified Affordances and Motivational Orientations

Competition similarly produced contrasting responses. Some students viewed scores and peer comparison as motivating, while others associated them with pressure, anxiety and negative self-evaluation. Concerns increased when performance determined personalised pathway allocation, potentially signalling differences in ability or status. Achievement Goal Theory (Elliot and McGregor, 2001) explains how competition can generate different responses according to achievement orientations, while PEF suggests that competitive features support engagement when they correspond with individual motivational preferences. A leaderboard may motivate a student who enjoys social comparison while creating performance pressure for another. This issue also extends to personalisation. Pathways intended to meet individual needs may inadvertently make learner differences visible, potentially creating embarrassment, stigma or peer judgement. A personalised pathway may therefore achieve cognitive fit by adapting material to learning needs while creating social misfit if that adaptation exposes perceived differences in ability. Optimising content for the individual may not, therefore, optimise the wider learning experience.

5.4 Dynamic Learning as a Fit Phenomenon

Collectively, the findings suggest that dynamic learning is better understood as a fit phenomenon than as the consequence of particular LMS features. The value of gamification and personalisation depended on their alignment with students' preferences, motivational orientations and desired social interaction, consistent with PEF theory (Muchinsky and Monahan, 1987; Kristof-Brown et al., 2005). Neither approach is therefore inherently superior: both can promote engagement when alignment occurs and create friction when it does not. This also suggests that extensive technological customisation may not always be necessary. Existing LMS features can support dynamic learning when combined to provide meaningful flexibility and choice. The critical consideration is not the sophistication of individual features but whether students can use them in ways that correspond with their learning preferences. Educators and LMS designers should therefore provide complementary options for interaction, progression and participation while maintaining appropriate guidance and structure. Incorporating the student voice is particularly important because students' perceptions can identify where fit and misfit occur. Overall, PEF provides a coherent explanation for why the same dynamic pathway can support autonomy, motivation and engagement for some students while generating uncertainty, pressure or disengagement for others. Rather than seeking a universally optimal pathway, dynamic learning should provide sufficient flexibility for students to achieve an appropriate fit between their needs and the affordances of the LMS.

5.5 Limitation and Future Research Opportunities

The relatively small sample (n = 17) limits the transferability of the findings, while participants responded to hypothetical demonstrations rather than sustained use of the pathways; consequently, perceptions formed through authentic course participation may differ. Therefore, future research should examine gamified and adaptive learning pathways through authentic, longitudinal implementation rather than vignette-based scenarios, enabling students' anticipated preferences to be compared with their actual learning behaviours and experiences. Studies with larger and more diverse samples across disciplines and institutions would also strengthen the transferability of findings. Further research could investigate dynamic learning explicitly through a Person–Environment Fit lens, examining how individual differences in preferences, motivational orientations and desired levels of social interaction influence engagement with particular LMS affordances. This could help identify not a universally optimal pathway, but the conditions under which different pathway designs create fit or misfit for different learners.

6. Conclusion

This study explored students' perceptions of two dynamic learning pathways (1. gamified pedagogy and 2. adaptive learning pathways) designed within the constraints of a learning management system (i.e. Canvas).

Overall, engagement was influenced by the alignment between learner characteristics and the affordances of the learning environment. Through a PEF lens, engagement is therefore not inherent to a particular pathway or feature but emerges when students' needs, preferences and motivational orientations align with the learning environment. Supporting perspectives from Universal Design for Learning, Self-Determination Theory and Achievement Goal Theory help explain differing responses to interaction, autonomy, structure and competition. The findings suggest that the value of dynamic pathways lies in providing sufficient flexibility, choice and guidance to accommodate diverse learners. Rather than pursuing a universally optimal design, educators should incorporate student perspectives to create learning environments that enable an appropriate fit between learner needs and LMS affordances.

Ethics Declaration

The authors received ethical clearance from the Social Research Ethics Committee, University College Cork, Ireland.

AI Declaration

AI (ChatGPT) was used solely for grammar, spelling, punctuation, and language refinement. The ideas, analysis, interpretations, and conclusions presented in this work are entirely the work of the research team.

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