Degrees of belonging: Gaining insights into university students' belonging through theory-informed learning analytics

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ABSTRACT: This poster reports ongoing work to leverage learning analytics for enhancing students' sense of belonging in higher education. Despite the importance of belonging for student engagement, there is a significant research gap in how to monitor and support students' belonging throughout their degree programs. Using an innovative, theory-informed learning analytics approach, we conduct a study to gather and analyze both quantitative and qualitative data on students' belonging at scale via the SenseMaker® tool. This platform allows respondents to share narratives (referred to as 'stories') and then code these using signifiers grounded in theories of belonging. Currently conducted at an institution in [country blinded for review], we invited in-degree students across the university to share their stories of belonging (or alienation). The poster presents preliminary findings from the collected data and discusses possible interpretations and future directions, contributing to the emerging subfield of Belonging Analytics.

Keywords: belonging analytics, sensemaking, theory-informed learning analytics, participatory narrative coding

1 INTRODUCTION

Student belonging is crucial for academic success, retention, and well-being in higher education (Meehan & Howells, 2019). It is complex (Allen et al., 2024), dynamic (Kahu et al., 2022), and influenced by context, culture, and personal demographics (Gravett et al., 2023). Negative feelings of belonging can affect students' motivation to learn, making it essential to monitor and support student belonging throughout their studies. However, measuring belonging is challenging. Quantitative methods like self-report instruments and national surveys provide large-scale snapshots but lack deep insights and are often conducted too late for timely support. Qualitative methods, such as interviews, focus groups, and more recently vlogs (Gravett et al., 2023), offer deeper insights but are difficult to scale. The rise of online learning has further limited face-to-face interactions, reducing opportunities to observe behavioral cues related to belonging. There is a growing need for learning analytics to capture the complexity of student belonging and transform it into actionable insights for personalized support. Currently, data-informed approaches to support belonging are limited in learning analytics research (e.g., Benedict et al., 2022; Ramanathan et al., 2024).

To address the challenges, this study aimed to capture the complexities of student belonging in a higher education setting, via the use of an innovative research platform called SenseMaker® (Van der Merwe et al., 2019). SenseMaker® is an online mixed methods research tool that gives students a voice to tell their stories of belonging, and then index their own stories against the theoretical dimensions of this complex concept through 'self-signifiers'. Moreover, the platform's analytical function visualizes data through dashboards in a dynamic way. This pilot exploration has two goals: 1) To design a SenseMaker® framework grounded in theories of belonging; and 2) to examine patterns of student belonging derived from participatory narrative analytics in a higher education setting. This

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exploratory work contributes to the topic of 'Belonging Analytics' (Lim et al., 2023), an emerging field that leverages learning analytics to gain insights into belonging.

2 METHODOLOGY

This study is being conducted at the University of Technology Sydney, Australia, a research-intensive, public university, under an ethics-approved research project. All students were invited to participate through a general student newsletter. Students were presented with a flyer explaining the study and directed to a link to the SenseMaker® platform to share their stories anonymously. They could also share more than one story; individual stories were not visible to participants. Participants had the option to enter their institutional email addresses to enter a draw to win one of ten $50 gift vouchers.

We designed a SenseMaker® framework grounded in theories of belonging. In so doing, we reviewed the relevant literature on student belonging in higher education to identify key dimensions, indicators, and factors of student belonging. We also consulted with key stakeholders—faculty, staff, and students—to obtain their feedback on the design of the framework. In the platform, students were prompted to input their stories of belonging in a text box provided, describing the experience as fully as possible, in 1 to 2 paragraphs. An example of a signifier and how it is grounded in belonging theory is shown in Table 1. The signifiers were presented in the form of a triangle ('triad'), anchored by each of the conceptual dimensions. Students placed a marker within the space of the triad, to indicate how they felt about their experience in relation to the signifier; for instance, if their story was more about their sense of self-identity, they would place the marker closer to that point of the triad. Students could also indicate 'N/A' for any signifier(s) if these were not relevant to their story.

Table 1. Example of theory-grounded self-signifiers used in the Sensemaker framework.

Theoretical grounding	Question	Signifier
Academic belonging (Kahu et al., 2022)	The experience in my story had an impact on my…	**Triad:** • Sense of self-identity as a person • Sense of identity as someone working in my discipline • Willingness to persevere in my studies

3 RESULTS AND DISCUSSION

To date, 55 students across a range of disciplines have participated in this study, with 49% being in the first year of their degree. Figure 1 shows preliminary data from three of the signifiers used in this study, providing some insight into how students experience belonging. For example, students' stories of belonging expressed a desire for identity (Figure 1(L) and (Mid)). More students also wished they had more support for their mental health based on their stories (Figure 1(R)). On the whole, 72% of the respondents indexed their stories as being 'positive' or 'strongly positive'.

These preliminary results resonate with some of the existing empirical work relating to first-year students' belonging experiences, especially the initial focus on interpersonal belonging (e.g., Kahu et al., 2022). The finding that more students were hoping for more support with their mental health is especially notable; as an educational implication, support for psychological wellbeing is important for staving off the anxiety which comes with transitioning to a new academic and social culture. Possibly, inviting students to share their stories at regular intervals as a regular reflective activity can provide

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important information about their ongoing sense of belonging, to inform timely and personalized interventions. Furthermore, these visualizations could serve as dashboards to program leads, providing information about students' belonging as they progress through their degree programs.

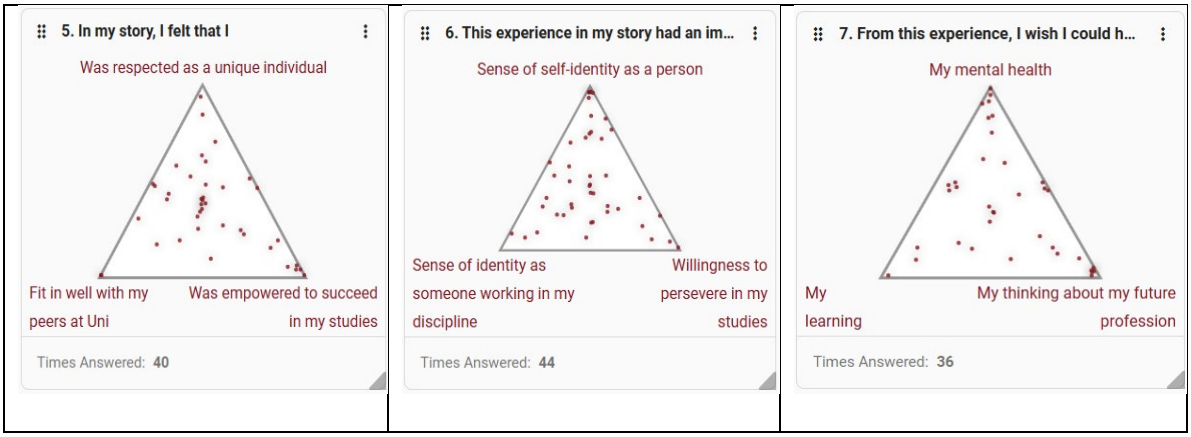

Figure 1: Example data visualisations from three self-signifiers used in the study. (L) Interpersonal belonging; (Mid) Academic belonging; (R) Impact of belonging experience on wellbeing

When the data collection for this study is completed, the text data gathered from respondents' stories will be qualitatively analyzed further for themes, and quantitative data from the signifiers will be explored to gain further insights into subgroups of students.

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