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Mapping learning microclimates in a large-cohort online course: Seeing the trees in the wood

Kay Hammond
Auckland University of Technology, Auckland, New Zealand

As the number of students in online classrooms continues to rise, understanding the microclimates that influence teaching and learning becomes crucial. This paper presents a map of existing and potential microclimates in a large online course and offers guidance on developing such maps to enhance student well-being and learning outcomes. By drawing on the concept of microclimates from natural sciences, educational microclimates are defined as the norms, attitudes, and behaviors within a subgroup of people in a larger social climate. The study explores various social microclimates within online spaces, aiming to create more inclusive and interactive communities that foster essential skills for students. A six-step process for developing microclimate maps is proposed, highlighting the importance of considering student demographics and engaging in continuous reflection and improvement, seeing the trees in the wood. Ultimately, understanding and leveraging microclimates can lead to better course design and support the diverse needs of students in large online cohorts.

Keywords: educational microclimates, student experience, mapping, social presence, learning design

Classroom microclimates

Ehrhart at al. (2013) states that, “cultural inquiry rests on the fundamental assumption: It is wise to know where you are before beginning to change” (p. 238). This is more relevant today than ever before as we shift our mindsets from the past into new pedagogical and technological ways of educating students. Educators working in online education work in environments blending culture and technology. But concern has been expressed about maintaining quality standards for online teaching (Jaggars & Xu, 2016). Good online engagement practice has included: instructor presence, student sense of belonging and identity, active learning, feedback, clear communication and expectations, and effective use of technology (Jaggars & Xu, 2016; Krause & Armitage, 2014; Stone, 2017). Online learning research shows broad trends towards system establishment and media, with less attention on teaching and learning resources, communications, and engagements (Gurcan & Cagiltay, 2023). The human experience within the online platform is something educators have some agency over when developing courses, but the design and evaluation processes can feel overwhelming in large cohort class design. As new learning approaches develop, “academic and professional staff need to be supported to adapt to this new world.” (Krause & Armitage, 2014, p. 33). Focusing on manageable scope and prioritising detailed exploration and innovation offers an opportunity to move forward.

Online learning offers multiple spaces of engagement, each with the potential to impact student experience and learning. These can be considered as microclimates of the course. The concept of a microclimate derives from natural sciences which studies how localised elements such as temperature, precipitation, and wind characterise the environment in a small-scale area of a larger region (Yang et al., 2019). In a similar vein, educational microclimates can describe the norms, attitudes, and behaviours of a subgroup of people within a larger social climate (Loewen, 2022). Loewen described the embedded and interconnected nature of educational microclimates in higher education by stating,

> Any tour among higher education classrooms may be seen as an experience in educational microclimates. Each space has unique variations in form and content, pedagogy, and discipline. Every iteration of a course has its own unique environment. Readily observable differences include dissimilarities in instructors, students, sequences of events, topics, decorum, and methods of instruction. In walking from building to building or from one discipline to another, a greater sense of these microclimates amid the context of their wider institutional climate comes into focus. (p. 209)

Likewise, as the virtual education landscape expands, online settings influence educational and personal experiences. The move to online education carries with it some of the biases and customs of the traditional in-person teaching styles, which do not suit all learners. Unexamined microclimates may negatively impact the learning experiences of students who may feel excluded or less confident interacting online. This presents

challenges for educators designing online learning spaces. This is important in large cohorts containing ethnic or other diversities that may feel uncomfortable in the larger spaces such as tutorials and discussion boards. Online courses can be evaluated and developed by focusing on student surveys, faculty review, student achievement and retention. Greater depth can come from student interviews, focus groups, or faculty peer observations. Focus areas can be the course content, course design, the learning environment, and student support resources. Evaluative rubrics can be used to cover multiple aspects of the course (Lee et al., 2020). While these broader approaches can be informative, they can also be overwhelming for staff who have to develop the changes within limited time and resources. Exploring social microclimates within online spaces in higher education enables educators to create more inclusive and interactive communities to help learners develop the professional and social skills required by their intended professions. Such skills include independent and critical thinking, collaborative work, and contributing to their communities. This concise paper is a reflective case study that conceptualises a process of identifying microclimates and those suitable for change in the following semester within a large-cohort course.

Context – engaging with a large-scale online cohort

This study arose from the experiences of the lecturer and senior lecturer, each with over ten years of blended and online teaching experience who currently teach on a fully online course. The course is Methods of Research and Enquiry at Auckland University of Technology. This is a second-year undergraduate course for health science students. The course is managed on the CANVAS learning management system (LMS) and had over 650 enrolled students from diverse ages and ethnicities in the first semester of 2023. We noted our limited interaction with a segment of the enrolled population, mostly with those who attended the optional online live tutorials or posted questions on the asynchronous discussion board. Those who did attend the tutorials mostly kept their cameras and microphones off. We also noted unequal assessment non-submission rates across some demographics. This left us wondering about the sense of social presence in our courses and feeling overwhelmed at the prospect of developing our course. We wanted to experience the stronger connection we felt from in-person classes prior to the pandemic and to improve the online learning experience for students.

Mapping a classroom microclimate

Despite abundance of research recommending more instructor-student interaction, this is impractical in large cohorts (Andel et al., 2020). Microclimate analysis requires consideration of available resources to investigate and develop innovations. This can identify specifically where it is practical to increase instructor presence or other resources for particular learning points or social groups. We used a Cooperative Inquiry method to decide what was important and how we might make changes (Heron & Reason, 2006). Drawing from industrial psychological frameworks of social climates (Ehrhart et al., 2013), we mapped our perceptions as leaders and observers who are also responsive to student feedback (see Figure 1). The following six steps explain our map development.

Step 1) Collect data through concurrent course leaders' discussion and visual mapping. We first discussed the broadest climates such as the course home page, recorded lectures, online tutorials, discussion boards, readings, and assessments (dark borders).

Step 2) Group broad climates along dimensions of synchronous/asynchronous. This gave us an overview of our large online course – 'the wood' and helped us select particular locations – 'the trees'.

Step 3) Identify and select target microclimates to map in greater detail. Initial identification of a microclimate can be made as educators define a small, manageable area which has some sense of containment within dimensions of: digital space, social group, time period, skill etc. Within our broad climates, we noted focused aspects of our tutorial, discussion board, a new groups feature, and an external resource opportunity to explore (shaded ovals).

Step 4) Within selected microclimates, expand descriptions to include relevant dimensions of social, cognitive, emotional, and/or learning aspects. This aligns with the framework of a Community of Inquiry in which cognitive, social, and teacher presence dimensions that combine to create the educational experience (Garrison et al., 2000). Microclimates may exist on a continuum of dimensions, with some being more social than cognitive, while others, such as readings may be more cognitive than social. The map may be complete at this step or progress further to identify potential expansion with a further step.

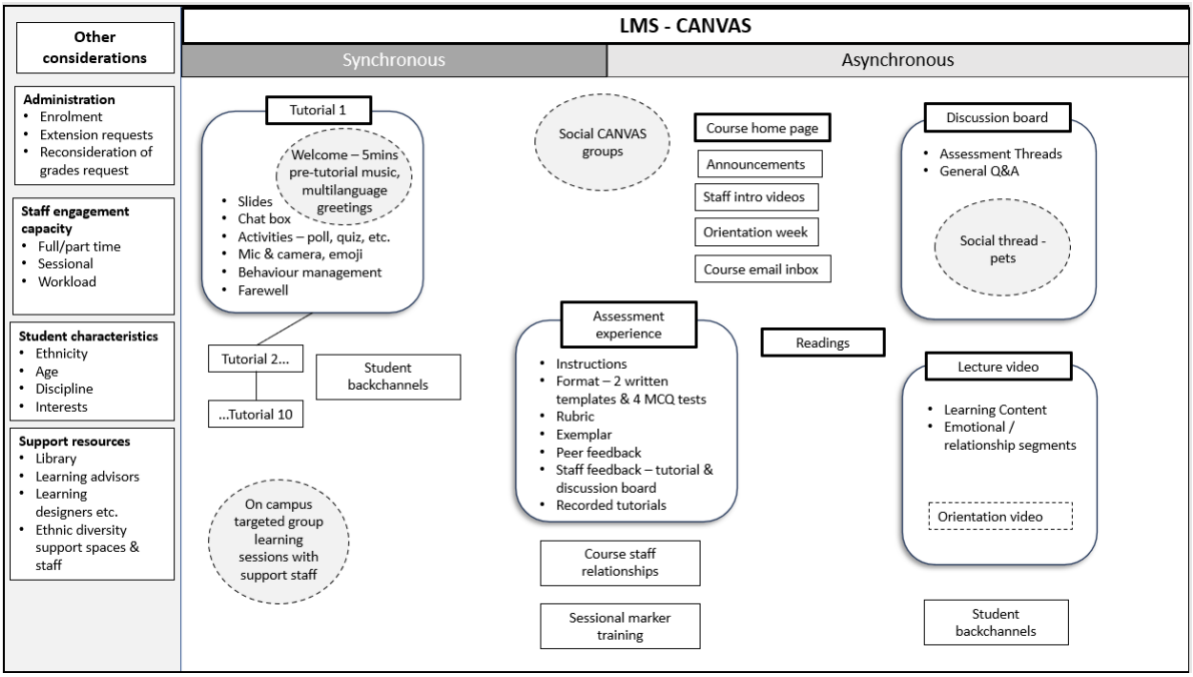

Figure 1: Map of existing and potential microclimates in our online course

Step 5) Identify other considerations such as the student demographics, additional resources, or procedures and see if there is scope to identify or build potential microclimates. Examine the demographics of the student cohort and be mindful of inclusivity and avoidance of deficit thinking. For example, student sub-groups include characteristics of different: ages, ethnicity, technical ability, English level, hesitancy to ask for help, course retakers, personal interests in a healthcare profession, hobby, or life situation (e.g., rural living). In our course one of the mature students brought to our attention they had a backchannel Facebook group going for our course. In our map, we indicated current and proposed changes and proposed innovations with shaded circles. We selected the social, emotional, cognitive and engagement/learning outcome dimensions because we experienced the course socially as leaders and value positive student experience and learning success. This also aligns with Kahu's (2013) social engagement framework where social environment influences students' engagement and learning. This holistic framework includes a complex interplay between institution, staff and student factors. Key dimensions of the social framework are: a sense of belonging; reciprocal relationships; collaborative learning; and a supportive learning environment. Thus, microclimates within a course are influenced by wider university processes. We represent our exploration of four microclimates in Table 2. Three microclimates we have started innovating (tutorial welcome section, a pets thread on discussion board and ran face-to-face targeted learning sessions with Pasifika students). Targeted learning sessions combine teaching and learning support staff in one location and enable students to move freely around a learning space to focus on their personal assessment interests. They have been successful in encouraging students who hesitate to reach out for assistance (Cameron et al., 2012).

Table 2: Illustrative dimensions of investigation for microclimates

Dimension / location	Student metrics*	Social	Emotional	Cognitive	Engagement / Learning outcomes
Tutorial pre-start	• 214 (33%) • $\bar{X}$ total attendance 56.3 mins • No. pre attendance	1. Greeting 2. Chat box 3. Backchannels 4. Mic & camera 5. Sign off	Other students' behaviors, teachers' behaviours, music, visuals, language tone	Slides, verbal explanations, Q&A, activities	Understanding lectures & assessments, evaluative polls
Discussion board social thread - pets	• % visiting • No. posts	Comments & reactions to photos	Relaxing & entertaining cuteness		Engagement with slides to see classmates' pets

Targeted learning session	• No. non-submissions in target groups • Attendance at TLS	• Synchronous dialogue • Social networking	• Reassurance & confidence to progress • Validation • Confidence	Targeted assistance.	• Assessment completion • Deeper learning
Potential microclimate – mature students' group	60 (10%) 25+ students	Social networking	Peer support	Peer assistance	• Assessment completion • Deeper understanding

*Estimates for illustrative purposes

Step 6) Reflect on the applications and limitations of the map. The map does not have to be fully completed to be useful. Map development proceeds until the desired level of understanding is achieved in which educators and designers can create and implement an innovation or gather more detailed data about a microclimate of the online environment. The map can be built from the perspective(s) of students, educators, course observers, or LMS data. Each lens, or combination, may offer a different map. For example, a student mentioned the use of a live Facebook backchannel for a certain student demographic that they used during the live tutorials. Such microclimates associated with the course are not visible to instructors. Thus, microclimates can also be initiated by students as effective ways to promote good learning and social experiences.

Future vision

Mapping and identifying effective microclimates can be adopted as common practice within the institution. The consistency of delivery online can help students feel connected to the university when they see the same formats in multiple courses. This may be particularly relevant in high traffic areas such as the course home page and navigation patterns to key resources and assessments. High traffic sites may also offer incidental encouragement opportunities in visuals such as banner headings, for example, a positive affirmation or link to extra support. We aim for a fuller study with ethical clearance for LMS data use and analysis of student perspectives. We will engage in a longitudinal study to show how changes in microclimates may impact other experiences and successes. We plan to use an action research approach (McNiff, 2016) as we collaboratively construct and critically reflect on current and future maps. Based on this we will implement and evaluate actions to determine their effects on participants' (teachers and students) experience and learning. LMS data can be analysed for descriptive purposes such as patterns of use from which microclimates may be identified based on student click rates, although high traffic does not necessarily indicate more learning (Wilson et al., 2017; Duin & Tham, 2020). Our current LMS has data analytics that track student activity and success within the platform. We plan to track student interaction with specific interest groups, such as the mature age group, and the success rates of demographics groups with typically higher incompletion rates to see if addition of a targeted learning session can help these groups. We will continue to identify and attend to microclimates within our online course and share our findings.

Conclusion

Designing courses of large online cohorts presents a challenging variety of options for evaluation and innovation. Creating a microclimate map helps break down the overwhelming scope of an entire online course for educators. Considering the course to be a collection of microclimates enables educators to map out the larger (the wood) and smaller details of their courses (the trees). This paper described the process of developing a microclimate map of a large online cohort and how it could inform manageable innovation and evaluation. By knowing where they are, educators and designers can prioritise changes and monitor multiple perspectives about their contributions to the student experience and learning.

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