

## Breaking barriers, building community: improving student engagement with preparation for studying online multidisciplinary science by distance learning - a case study

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### Abstract

Developing an online learning community can help to improve student success. This presents a challenge as the student cohort is often time-limited and shifting in composition before a module starts. The continued evaluation and development of an online preparatory website for the new, year one module S112 - *Science: concepts and practice* is reported. Evaluation of the site in 2017-18 showed high levels of student satisfaction with the resources, though very little engagement with the asynchronous forum. Therefore, improvements before the October 2018 module start centred on increasing student engagement on the forum: Firstly, tutors moderating the forums were tasked with developing several optional scientific tasks for staged release to generate student discussion. Secondly, volunteer peer mentors from the 2017-18 presentation were recruited and trained as “student buddies” to provide non-academic advice and support.

Student engagement increased markedly prior to the October 2018 module. The clearest emergent theme from tutors who moderated the forums was that students were seeking to establish a study community, rather than obtain subject-specific advice. Student response to the buddies was positive, with students more willing to ask questions of the buddies than of

the tutor moderators. Data for S112 show that registrations at module start increased by 23.5% from 2017 to 2018, and early withdrawals (14 days after module start) dropped by 2%.

Our results provide ideas for building online student engagement, particularly in scenarios where students may come and go, and have little available time: for example, bridging gaps in time or academic readiness, whether by blended or distance learning.

### 1 Introduction

#### 1.1 Context

The Open University (OU) launched a new undergraduate multidisciplinary science module in October 2017. S112 – *Science: concepts and practice* is a level 4, 60 UK-credit module designed to be studied after a level 4, 60-credit introductory science module. S112 therefore bridges students to more specialist science study at level 5. It focusses on skills development, including study of Earth science, environmental science, biology, chemistry and physics.

The OU policy of supported open entry includes advising students on their readiness

to study, but the decision to enrol on a particular module remains their own. In October 2017 a large number of S112 students had either not studied one of the intended introductory modules, or were co-studying S112 alongside an introductory module or a specialist level 5 module.

In order to better support our distance education students over the summer, a preparatory website (“prep site”) for S112 was built on the University’s Virtual Learning Environment (VLE). Opening 5 months prior to module start the web site structure involved:

1. A welcome message to encourage further engagement with the site.
2. A self-assessment quiz: “Are you ready for S112?”
3. A menu of short (a few hours) self-selection study options, to help reduce weaknesses identified in the self-assessment quiz, or to boost motivation. These covered: maths, chemistry, practical science, online study skills, and further reading and were flexible to enable time-poor students to prioritise their activities. Students with more time could work through all the materials. Options were targeted at areas students most frequently struggled with.
4. An invitation for students to post questions and communicate with each other on a forum moderated by S112 tutors.

The prep site was accessible to all students, not just those who had registered for S112 so the composition of the student cohort varied over time when the prep site was available. Individual student access was relatively short term, contrasting with a more cohesive group of students studying a module together. This has implications for both participation (potentially lower through lack of cohesion and poor sense of belonging), and learning (from pure self-selection of study materials).

## 1.2 Building a short-term online study community

Benefits of authentic interaction and collaboration in education, particularly deeper learning, are well documented (e.g. O’Neill *et al.*, 2011). Achieving this in distance learning is challenging, needing appropriate technology, course design and communication (Chih-Hsiung & Corry, 2003). Student and teacher perceptions of quality in distance learning correlate strongly with these, including communication and associated establishment of a learning community (Ortiz-Rodríguez, *et al.*, 2005; Menchaca & Bekele, 2008). An established learning community is also linked to improved retention and success (Moore, 2014).

Research into building online learning communities often focuses on student cohorts throughout their study of a module or programme (e.g. Glazer *et al.*, 2013; Lai, 2017), and as part of a blended learning approach (e.g. Wilson *et al.*, 2004). While losing contact during part-time distance learning is normal (Ross *et al.*, 2013), there is less research on establishing learning communities over shorter timescales with a changing student body. To address this, Ross *et al.* (2013) identify “designing openings” – opportunities to stay in touch - as a strategy to help students maintain contact and build resilience.

Nipper (1989, cited in Palloff & Pratt, 2007, p.12) states that establishing “presence”, (the extent to which a person is perceived as being “real” in the online environment) is crucial when building an online community. Interpersonal contact is required to establish presence and promote participant interaction, leading to feeling a sense of belonging before a course begins: “*the need for social connection is a goal that almost supersedes the content-orientated goals for the course*” (Palloff & Pratt, 2007). West (2010) also highlights the need for informal learner-learner interaction to establish social presence in the early stages of building community. Palloff & Pratt (2007) suggest threaded forum discussions, or student-established personal webpages for students to exchange personal information and build presence. When facilitating interaction within a diverse group of students over a short time scale, forum threaded discussions present

fewer technical barriers and are easier to manage than webpage development.

Cuthbertson & Falcone (2014) suggest several strategies to increase engagement and community on online courses, but synchronous online sessions are difficult to organise for a shifting part-time cohort. However, providing students with a place to share interests, thoughts and ideas, and ownership of discussion threads on academic topics, are easily implemented on an asynchronous forum.

### 1.2.1 Peer mentoring in online settings

Definitions of “peer mentoring” vary, but all recognise a distinct difference from “peer assisted learning” whereby student peers help each other to improve their acquisition of knowledge on a course, as defined by Sampaio *et al.*, (2010). Here, peer mentoring is where a few students who have studied a module help to support new students online studying the next presentation of the same module. These peer mentors do not provide academic support but answer student questions covering diverse topics including practical and digital study skills, emotional and moral support, navigation of online resources, confidence building and community building.

Peer mentoring in UK HEIs has been predominantly developed in face to face settings, with small groups or a 1:1 basis, reliant on face to face meetings (see Collings *et al.*, 2014). This is not possible with distance learners based in the UK and internationally. Our schemes run across different modules in STEM from levels 4–6 for between 200–1200 students (Robson *et al.*, 2018a, Robson *et al.*, 2018b). All are delivered on asynchronous online forums in the virtual learning environment (VLE). A variety of formats were trialled from dedicated student buddy forums, to specific threads in student Café and academic forums. Student buddies are volunteers working in teams of 3–8 per module. This allows peer mentoring to be delivered at scale, asynchronously in an online setting.

The present study translated the standard scheme described above to a short term, pre-course model running over several weeks, as early engagement with study is known to benefit students and improve the learning

outcome for them (Fox *et al.*, 2010, Heirdsfield *et al.*, 2008).

### 1.3 Aims of the study

The paper represents a case study tracing early prep-site evaluation from its first iteration on S112 in 2017; through changes made for 2018 and the effect of these changes. Alterations and additions focussed on improving student engagement and interaction on the prep site forum. The aim of this research is to evaluate the interventions used, and to share recommendations for good practice. Our findings and recommendations may be relevant to both distance and blended learning where there is a need to build quickly an online community in preparation for future study.

## 2 The first iteration (2017)

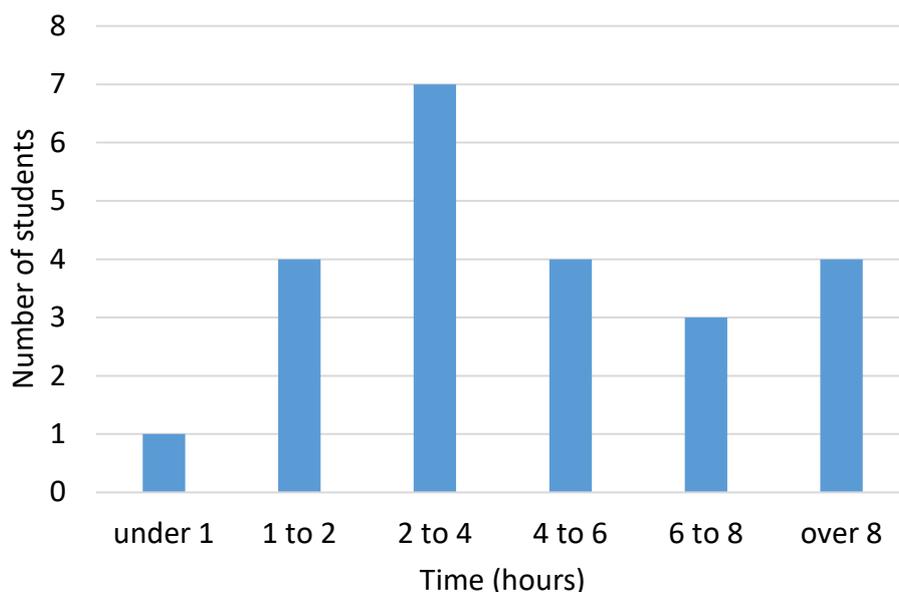
The prep site was open April to September inclusive prior to the first presentation of S112 in October 2017. Two S112 tutors acted as forum moderators and students were invited to complete an anonymous feedback questionnaire on the site.

This questionnaire collected demographic data (age range and gender); simple information on previous study; estimated usage time; with a 5-point Likert scale measuring student satisfaction with different aspects of the site. Students could vote for additional features to be included in future and leave free-text responses on both the strengths of the site and areas for improvement.

Questionnaire feedback, forum postings analysis, and responses to open questions posed to the two tutor moderators for additional peer review, comprised the evaluation measures.

### 2.1 Results and discussion of the student questionnaire and forum use

According to VLE usage data (automatic recording of numbers of posts or replies and readers on the forum), 542 students accessed the prep site while it was open; of these, approximately 4.5% (24) completed the feedback questionnaire. Respondents comprised 10 males and 14 females; with a bimodal distribution between the 18–24 and 45–54 age categories, suggesting that these two groups may be more engaged and/or



**Figure 2.1** Distribution of the total length of time respondents reported using the prep site for ( $n = 23$ ).

interested in the site.

66% of respondents had already studied one of the feeder modules, and 15% had no previous experience of OU study. The majority had some form of prior science or maths qualification at level 3. Figure 2.1 shows the total length of time respondents reported using the prep site for. The modal time of 2-4 hours is consistent with estimates for the time needed to complete the self-assessment quiz, and perhaps engaging with one study option. Some students reported usage times of over 8 hours, and this likely represents those with more disposable time.

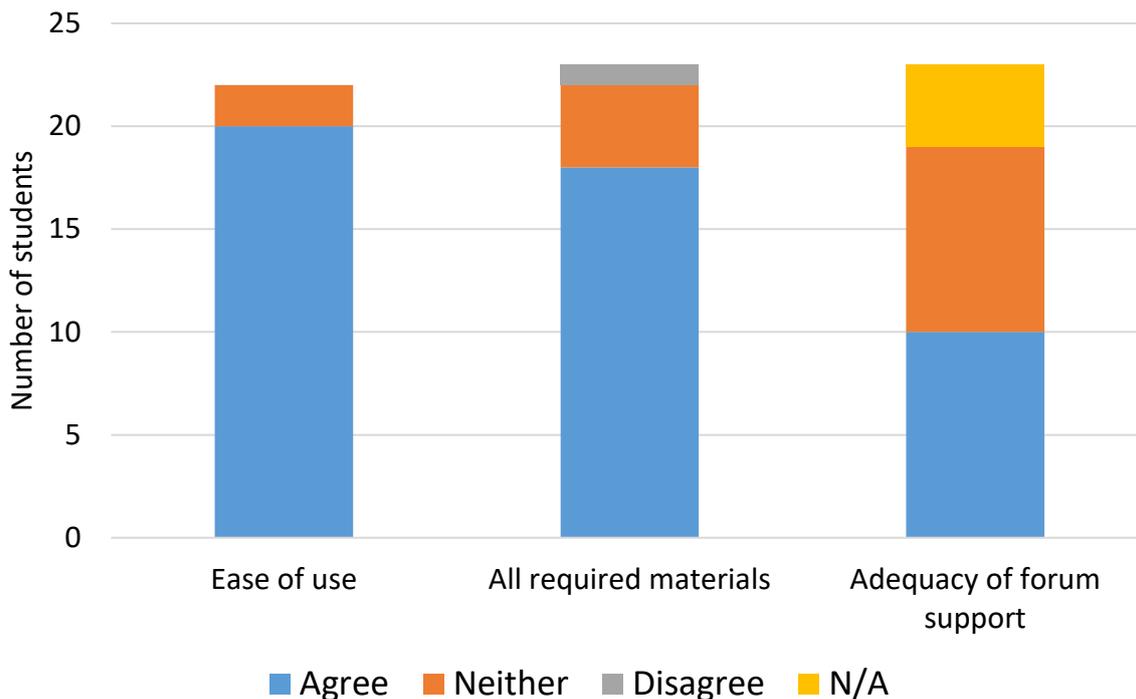
A five-point Likert scale was used to measure respondents' views on various aspects of the prep site by responding to simple, positive statements by choosing from: strongly agree; agree; neither agree nor disagree; disagree; strongly disagree. A "not applicable" option was included where appropriate. Given the small sample size, responses were aggregated into "agree", "neither agree nor disagree", and "disagree" for analysis.

Figure 2.2 demonstrates high levels of agreement for ease of use and site content, but less agreement with the level of forum support,

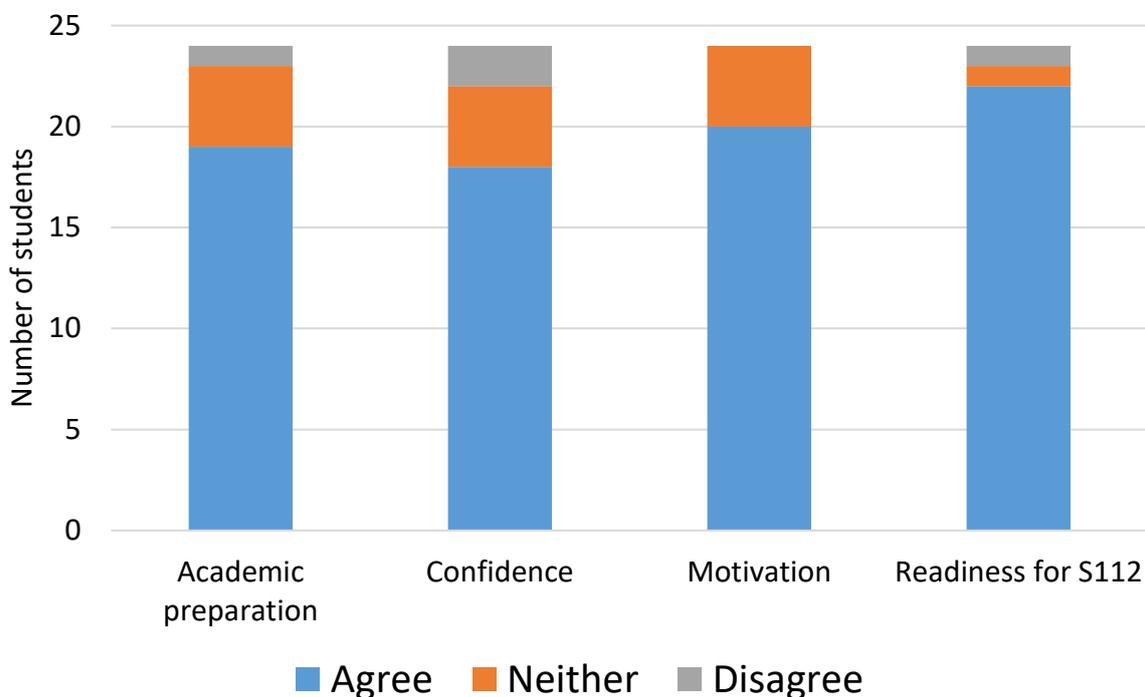
though students did not appear dissatisfied with the forum support: rather, they did not use the forum. This is supported by the fact that all six student forum posts on the prep site were concerned with student greetings (sometimes reacquainting themselves from a feeder module), and not academic preparation. This is consistent with the findings in Palloff & Pratt (2007) and may indicate there was inadequate opportunity for students to establish presence on the forum.

Feedback showing high levels of agreement across academic preparation, confidence, motivation and module preparedness (Figure 2.3) is reasonable, as the site was built around areas students needed most support with on a comparable predecessor module.

Student votes for additional features, to be incorporated in to later iterations of the prep-site are in concordance with the recommendations of Cuthertson & Falcone (2014). The most popular option was for synchronous sessions to support skills (12), though there was little appetite for synchronous study advice (3). A number would have liked more content (11), and the opportunity to communicate with former S112 students (7).



**Figure 2.2** Students' responses to the statements: the prep site was easy to use ( $n = 22$ ); the prep site contained all the materials I required ( $n = 23$ ); the forums provided an adequate means of support ( $n = 23$ ).



**Figure 2.3** Student responses ( $n = 24$ ) to statements regarding personal preparation, confidence, motivation and preparedness for the module.

Question		Summary of responses
1	Why did students use the forums?	<ul style="list-style-type: none"> <li>To check knowledge / skills.</li> <li>To re-establish contacts.</li> </ul>
2	Were the forums an adequate means of communication? Please explain.	<ul style="list-style-type: none"> <li>Yes, but below “critical mass” for discussion</li> </ul>
3	How could more interaction be encouraged in future?	<ul style="list-style-type: none"> <li>Students seemed more willing to respond to tutors; perhaps a range of tutors could post short profiles / academic interests.</li> <li>Run a home experiment.</li> </ul>
4	What are the strengths of the prep site?	<ul style="list-style-type: none"> <li>Ample materials</li> <li>Forum support</li> <li>Easily navigable</li> <li>Student sets their own pace</li> </ul>
5	How could the prep site be improved in future?	<ul style="list-style-type: none"> <li>Links to interesting websites (e.g. BGS)</li> <li>Short reading list of suggested titles</li> <li>Encourage “I’m looking forward to...” posts to propagate discussion / sense of community</li> </ul>

**Table 2.1** Questions to, and summary responses from, the two tutor moderators of the 2017 prep site.

There were very few responses to free text questions though these mapped to findings of earlier questions, with comments such as “good to reconnect with friends from my last module”, supporting the notion that students sought a social space (Palloff & Pratt, 2007). Suggested improvements encompassed minor technical issues, requests for the gradual timed release of additional activities (in agreement with the results of voting and prolonged usage by some students: Figure 2.1), while questioning the academic level of the content.

With the caveat that the sample size is not representative, the free text responses could indicate that earlier questions captured most aspects students sought to feedback on, and that satisfaction with the prep site was generally high. Alternatively, it may reflect student insecurity in expressing their own opinions.

## 2.2 Results and discussion of peer review from tutor moderators

Table 2.1 shows the tutor moderators’ responses to open questions which correlate with several findings from the questionnaire, particularly high student satisfaction with the

site design and materials. Their review comments in response to open questions were too brief for thematic analysis.

Tutors acknowledged forum use was for social contact but felt that too few users posted to encourage others and students may be happier responding to tutors. Including additional reading materials and links, extended to tasks such as a home experiment, or seeding a discussion on the forum by posting a question inviting replies agreed with both student feedback and the findings of Cutherston & Falcone (2014).

## 2.3 Conclusions from 2017

Despite the lack of representation from small samples, two broad conclusions were drawn:

1. The design, structure and materials on the prep site were student-friendly and reasonably adequate in terms of content and extent. More material in one form or another could be included.
2. Forum use was very poor with too few students posting for discussion and an emphasis on students connecting with

others rather than obtaining academic support. Work was needed to improve forum engagement and build a study community.

### 3.0 The second iteration (2018)

Conclusions from the first iteration were utilised in prep site changes for 2018. Focussing on improving student forum engagement, both budget constraints and the time-limited prep site usage defined what could be implemented.

To bring together requests for more content and generate forum discussion, three forum moderators were each asked to devise two short scientific tasks (to invite discussion and results sharing) for sequential release on the forum on a fortnightly basis before module start. Thus six tasks were released over a period of 12 weeks.

Responding to student feedback requesting the opportunity to correspond with former S112 students, peer mentors were introduced on the forum based on the model already established elsewhere in STEM (Robson *et al.*, 2018a; Robson *et al.*, 2018b). Volunteer “student buddies” were recruited and trained, working on a rota inviting and answering non-academic questions on the forum.

Student feedback was invited using the original questionnaire (revised to account for the changes) but abandoned due to an extremely poor response rate. The three tutor moderators were asked to provide more expansive written peer review feedback (up to 500 words each) in response to the same questions, and the forum content was also analysed after the site closed. Forum data from 2017 and 2018 were compared using VLE and module data.

#### 3.1 Results and discussion of data comparison and forum inspection

Students registering for S112 increased by 23.5 % from 2017 to 2018, and early retention (10 days after module-start) on the module improved by 2 %. A number of complex factors could explain this (e.g. students avoiding a new module in its first presentation, students recommending it to others), but the prep site may have contributed; Moore (2014) articulates the link between improved

community and retention in distance learning. Evidence for this includes a ten-fold increase in forum posts in 2018 from 2017 (from 6-60), the majority of which were split roughly equally between the student buddies’ thread and responses to the first scientific task.

The buddies’ thread reflected their experiences of S112 in 2017 and highlighted students seeking general advice on the module and how to prepare. Students also frequently thanked the buddies, showing their help was appreciated.

Thirty-two students posted responses to the first scientific task, probably reflecting the simplicity of the task: following an example calculation, posting an image and repeating the calculation for themselves. Students engaged well, providing both information and their chosen images as well as discussing their collective postings. Responses to later tasks (which were more time consuming, scientifically challenging, and focused on scientific outputs rather than sharing information) were much lower (typically 1 to 3 posts). The tasks met Cuthbertson & Falcone’s (2014) recommendation to provide a place for student discussion on areas of mutual interest, but it is possible the transient nature of the cohort and time constraints were inadequate for students to establish their online presence, and therefore trust (Palloff & Pratt, 2007).

#### 3.2 Results, discussion and conclusions from peer review from forum moderators

Two thirds of the forum moderators provided individually written peer review in response to the questionnaire from 2017. The responses were more extensive so thematic analysis was applied, focusing on forum usage. Two rounds of coding were necessary to capture emerging themes (Table 3.1) which showed strong agreement between tutors.

Emerging themes support earlier speculation that students were seeking a social space in which to build a community, and that this likely takes precedence over academic matters during such early interaction (Palloff & Pratt, 2007). Students’ preferential engagement with low stakes tasks that facilitate social interaction suggest that prep site learning communities will

First order coding	Second order coding
<b>Some students were willing to use the forum.</b>	<p>Students made use of forums to greet each other and make contact, building a community.</p> <p>Students also sought clarification on some issues, and asked questions about the module (though not relating to the academic content).</p>
<b>Some strategies encouraged posting.</b>	<p>Students responded most readily to easy tasks that confirm knowledge or are “low stakes”.</p> <p>A small number of subject specific tasks enthused a small number of students with special interest, e.g. Earth science.</p> <p>Students enjoyed sharing personal information and reading about others.</p> <p>Student buddies were perceived by students as more reliable / authentic because of? their experience.</p> <p>Some subject-specific tasks enthused students with particular interests (Earth science)</p>
<b>Some strategies discouraged posting.</b>	<p>More academically challenging, lengthier tasks generated a much lower response rate from students.</p> <p>The prep site contained wording in one place implying the forum was for questions about academic content on the module.</p> <p>Too many forums and tutors can discourage student posting (though this wasn’t specifically noted as a problem on the prep site).</p>
<b>Improvements could be made to the prep site and strategy used on the forum.</b>	<p>Changing the emphasis in the prep site wording to encourage community building on the forum might encourage student engagement.</p> <p>Tasks should be simpler and “low stakes”, with more emphasis on sharing personal information.</p>

**Table 3.1** Summary of first order (left-hand column) and second order (right-hand column) coding to show emerging themes from tutor moderators’ peer review.

always be embryonic as most members won’t establish the presence needed to confidently engage (at least publicly) with more time intensive, challenging tasks.

Students’ available time for this optional activity may be a limiting factor for engagement (modal time of 2-4 hrs study in 2017: Figure 2.1). Given the themes in Table 3.1, together with the ready engagement with the lower stakes task and the buddies, it is also likely that the nature of some tasks was too challenging for students’ confidence.

## 4 Conclusions and Recommendations

The study shows that students value the S112 prep site, and that a particular approach was required in order to engage them on the forum and build a study community. Students could be encouraged to participate through two main strategies, which form the basis of our recommendations for future prep-site development, on this module and others, in 2019 and beyond:

1. Provide opportunities for contact with peer mentors (“student buddies”) for advice and answers to non-academic questions. This was popular, and possibly perceived as more authentic than asking the same questions of a member of staff moderating the forum.
2. Set small, “low stakes” tasks that entail sharing of appropriate personal information and interaction between students. This was an effective means of propagating discussion, but requires careful management, particularly regarding safeguarding concerns.

The transient nature of the cohort engaging with the prep site over a limited time prevents a full online presence being established. Students needed and valued social contact over academic matters in order to engage. Therefore, these findings have the potential to inform the design of online prep sites in other distance and blended learning. Importantly, getting students to take their first steps towards engagement through building a social online presence, rather than academic development, appears key to forming a learning community.

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