Project title: Online Chemistry Clinics

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Executive Summary

The “Chemistry Clinics”, now re-named as “Getting Ready for….”, were initially designed to enhance retention and progression in the second-year chemistry module, S215. This was felt to be particularly important as chemistry, perhaps like mathematics, is a subject where “fluency” in basic skills is essential for successful study at more advanced levels. In addition, we aimed to distil key chemical ideas out of feeder modules, such as S104, to ensure the readiness of the students.

The first presentation was in the month prior to 16J presentation of S215. The structure of the clinics involved the students working through a series of structured problems, based on areas covered in the S215 “Are you ready for…” quiz, along with worked answers. These questions and answers were sub-divided into five sections: The Atom, Compounds, Calculations, Energy and Organic. Relevant external links from highly regarded websites such as The Khan Academy and Tyler DeWitt were provided for each of the sections to help the students with the problems. Additionally, support was provided via a tutor supported forum and via bookable one-to-one OU Live sessions with a tutor or a member of central academic staff.

Student uptake was reasonably good with over 150 students, around 70% of the enrolled S215 students, visiting the site in the month prior to the S215 start date.

Around 20, one-to-one sessions were run, with several students attending on multiple occasions.

The effect on module retention and progression is harder to assess as several other modifications were also made during the 16J presentation of S215, such as the introduction of assessment week breaks.

The clinics received excellent student feedback on the website forum and were specifically mentioned in the S215 16J SeAM report.

Aims and scope

The aim of this project was to develop and implement an online chemistry clinic for students transitioning onto S215, the main level 2 chemistry module, with the overall aim of improving student performance, retention and progression on S215. In a broader sense, the project looked to demonstrate the importance of module preparatory-type materials and teaching activities across the STEM faculty.

Activities

Phase 1- Production of materials and provision of support

The initial focus for the project was to develop the materials for a standalone website to host the online clinic. The materials were structured such that they mirrored the content tested in S215 "Are You Ready For S215" quiz, which aims to ensure students have understanding of basic chemistry. The chemistry content was divided up into five topic areas:

1. The Atom
2. Compounds
3. Calculations
4. Energy
5. Organic

Each topic area consisted of a series of questions and fully worked answers. The rationale behind this element of the website design was to sub-divide the chemistry they had (ideally) previously encountered into distinct cognate areas that would allow them to focus on areas that they were struggling with. This structure encouraged the students to take ownership of their learning as they "chose" what they wanted to study. Another important aspect of the materials was the fully worked answers. These were predominantly handwritten/hand-drawn so that students could see how they were expected to be able to carry out calculations in problems, how to represent molecules/formulae etc. Examples of these worked answers are shown in Figure 1.

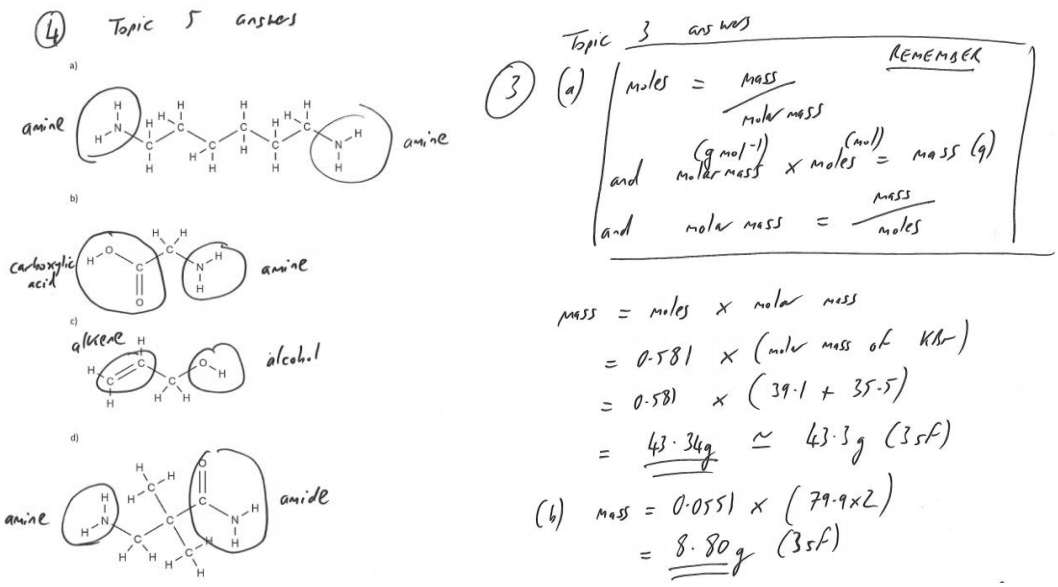


Figure 1. Representative example of the hand-written worked answers

Links were also provided to video clips from well-known external sources such as the Khan Academy. This feature was included to enable the students to access to bite-size reminders of content relevant to the problems they were tackling. Great care was taken to find resources that were well-aligned to how material had been taught in S104. This approach came from my experience of working with students at face-to-face institutions - I knew that such video resources are extremely popular (students would often share details of good online resources) and effective. I therefore wanted to highlight to OU students the existence of these resources as many of them would help with their study of chemistry at level 2 and 3. The structure of the website was kept fairly simple with all materials accessible from the front page (Figure 2).

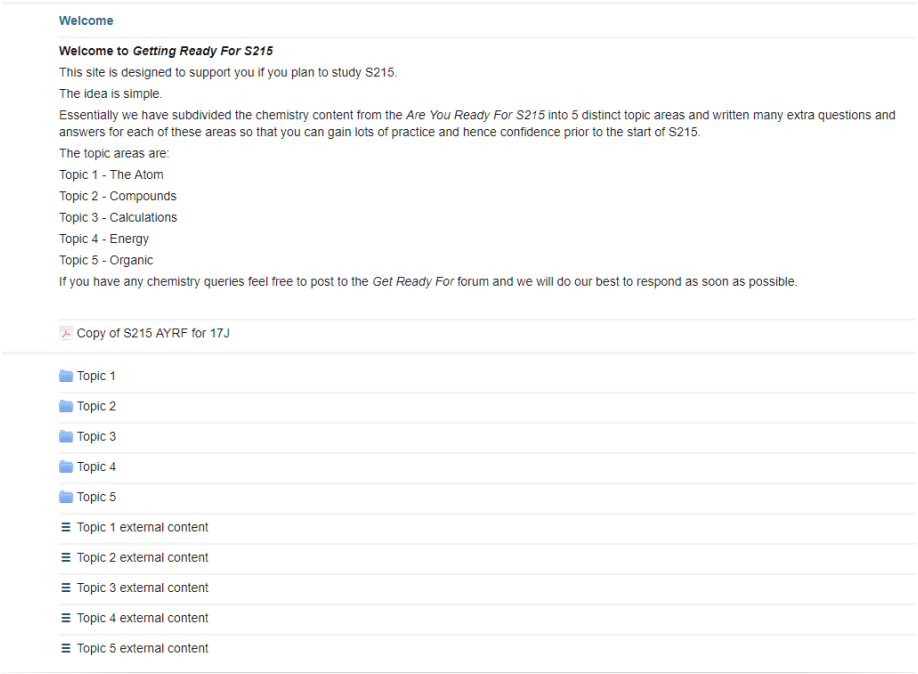


Figure 2. The structure of the clinic website.

Additionally, students were supported through a forum. The forum was supported by two ALs and by the project lead. Students were encouraged to use the forum to ask chemistry questions relating to the website material and to introduce themselves.

In addition, one of the key features of the project was the opportunity to book a 30-minute one-to-one OU live session with either of the ALs involved in the project or the project lead during the 4-week period of the clinic. This approach again stemmed from my experience at a face-to-face institution. In this role, I had organised one-to-one drop-in sessions for students studying either chemistry modules or requiring basic chemistry help relating to content from other science modules. These sessions ran each lunchtime during teaching periods and were manned by a rota of academic staff. The sessions were extremely popular. One feature of these sessions was a requirement that students came with a worksheet problem(s) that they needed help with. The students also needed to show that they had attempted the problem themselves beforehand i.e. they needed to engage with the learning process. We used this strategy to provide a "student-led" focus to the sessions and to ensure that they student was suitably engaged. Due to the success of this initiative, I wanted to adopt a similar approach to chemistry teaching at the OU. Therefore, there was no defined "tutor-led" content for each of these sessions and the students were requested to identify specific problems (from the website materials) they were struggling with when booking their session. A

variety of times were offered: weekday evenings, weekends and lunchtimes for the one-to-one sessions. There was a dedicated wiki where students could book the sessions.

The development of the teaching materials and website took place over the summer of 2016 and website went live to students at the start of September 2016.

Phase 2 – Implementation of clinic prior to the 16J presentation of S215

The clinic ran for the first time as a pilot, in the first four weeks of September 2016 i.e. in the four weeks prior to S215 module start.

We contacted all the S215 students who were registered in early July 2016 via a Camel message. This message explained the purpose and the structure of the website as well as detailing the support the students were able to receive.

As mentioned previously, students had access to tutor support either via the forum or teaching sessions ran on OU-live. In terms of the OU-Live sessions, four two-hour sessions were offered during each of the 4 weeks of the project. Students were given access to a wiki by which they could book their slots and were given the option to either book as an individual or as a small group, with a maximum of three attendees. These sessions were student-led in as much as the students needed to decide which problems they wanted to discuss, and hence which topic was focussed on. Over the four-week period of the pilot, around 20 students booked slots with tutors, with several students booking and attending more than once.

Phase 3 – refection, analysis and dissemination.

Reflection

After the pilot project had ended, feedback was taken from the students who had participated in the pilot via hidden a "tutor only" forum and via the "open" website forum. Additionally, feedback was received from the two AL's who had run one-to-one sessions and from Alchemy, the OU Chemistry society, who had canvassed opinion via Facebook. A summary of this feedback is given in the Finding's section of this report.

Analysis

Initially analytics data was downloaded on metrics relating to both the clinic website and the S215 16J website as a comparison, these included:

- Number of unique visitors to website
- Total number of visits to website

Additionally, the total number of bookings and sessions held in OU-Live room was recorded.

At the end of the 16J of S215 presentation, the retention profile of the student cohort was compared with previous presentations of S215 and other related chemistry modules. A discussion of all this data will be presented in the Findings of this report.

Dissemination

The results of the project were disseminated in the following ways:

- A presentation at the LHCS Away Day (October 2016)
- A presentation to OU Alchemy (October 2016)
- A workshop relating to "Retention" at the eSTEeM conference (April 2017)

- A presentation at the LDI / STEM Enabling Innovation to improve the Student Experience workshop (October 2017)
- A presentation during a workshop on bridging interventions to the Students First Transformation team (October 2017).

A discussion of the potential impacts of these dissemination activities will be presented in the Findings Section.

Findings

Feedback and Reflection

Feedback on the pilot scheme was taken from a variety of sources. The ALs were contacted by email and both replied detailing their experiences. The OU Alchemy students (the OU Chemistry Society) were contacted via the Facebook page, and this feedback was collated by the OU Alchemy president. Direct student feedback was collected via both the forum and the "tutors only" forum on the clinic website. This feedback is summarised in Table 1.

Source	Positive Feedback	Negative Feedback	Suggested Improvements
Associate Lecturers	Students who came to the clinic were pleased and got a lot out of it. The chance to ask questions in a private environment seemed to be appreciated and it was more of a confidence boost than anything else for some able but unsure students sessions? I enjoyed the chance to interact and chat with some highly motivated students	How do we encourage the less able to attend these sessions? Students felt swamped by number of questions. Some of the questions were harder than the students would have encountered on previous modules	Release a different set of question in each week of the clinic, to avoid students being swamped with material. More care needed to align study materials with prior learning
Students (direct and indirect from OU Alchemy)	Had you not run the Chemistry clinic I would probably have done little to no preparation for the module….* It's possible I would have looked at the course material in advance and worried I wasn't up to it whilst simultaneously doing absolutely nothing about it!	"daunting to come to a 'brush up your skills' refresher type pre-course and discover that you have to learn new ones before the course starts" Actually, I found it terrifying and was worried that I would not be able	Awkward booking system - "Might be better to say "On Saturday at 1pm we will be going through questions 7 and 11 from topic 4 if anyone wants to come along" for example, then people might be more at ease about dropping in, and

	I really needed some guidance and the Clinic provided that structured guidance……I think the drop in clinics are a genius idea…..I think this is an excellent way of teaching / preparing students for what looks to be a tricky (but interesting!) module external content videos and the little tutorials were very helpful where I couldn't work out the answer myself answers to the questions are very well explained and the videos top it up enjoyed having a one to one with a tutor	to keep up once the course started, until I started working through the questions. * It does feel slightly awkward booking the clinics though, like you are a bit stupid for needing to go over things that you learned so well just a few months ago? Re-name clinic as sounds/feels a bit negative. Reference answers/questions more closely to sections/part of level 1 module materials Publicise clinics more widely, including perhaps using Alchemy Facebook page. Questions sorted and flagged up more carefully. Stretching questions, need to be labelled as such, and I'd suggest having them at the end so that students don't feel obliged to attempt them	then can raise any other issues they have when they are there?"
Other sources (S215 SeAM feedback)	The Chemistry Clinic that was run by the faculty just before the start of the module was fabulous. It refreshed and consolidated my		

	previous learning from S104 and the level of engagement and feedback from the tutors was great - please run the clinic for future students - it really helped me		

Table 1. A summary of the main feedback received on online chemistry clinics received from a variety of sources.

* denotes responses from the same student (a negative comment on day 1 of clinic, and a positive comment at end of clinic).

Table 1 provides some interesting insights. In terms of positive feedback, both the students and tutors generally found it be a positive experience – it was particularly pleasing that many of the students wanted similarly preparatory websites on other modules they were/would study. On the negative side, it does seem that potentially these sorts of project may well appeal to the more able student i.e. the "worried well." In addition, the booking system was viewed as awkward and may well have been discouraging to potential participants. Other interesting concerns related to the sheer volume of material, and how this was off-putting, and that clearer links to level 1 OU modules would have been useful, as this would have allowed them to review content they had already encountered.

Data Analysis

VLE activity was monitored over the course of the project. Student uptake was reasonably good, with around 150 S215 students accessing the VLE over the duration of the clinic. This figure represents around 70% of the total S215 cohort in 16J. Figure 3 shows the number of unique students VLE visits per week and the total number of student VLE visits per week during, and just after, the clinic.

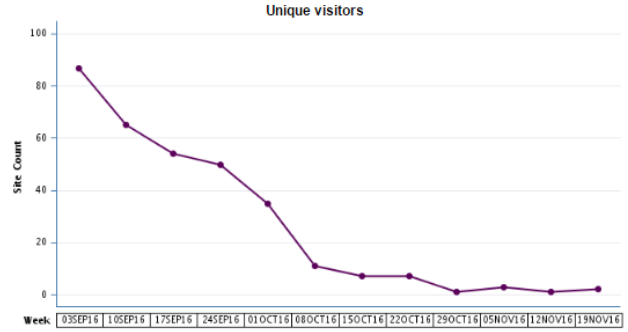
a)

Week	03SEP16	10SEP16	17SEP16	24SEP16	01OCT16	08OCT16	15OCT16	22OCT16	29OCT16	05NOV16
All Sites VLE Short Name All Users Type of User										
All Sites ⊞ ⊞ CHEMCLINIC Total Visits All Users Student	316	239	154	122	58	17	9	9	2	3
All Sites Total Visits All Users	316	239	154	122	58	17	9	9	2	3

b)

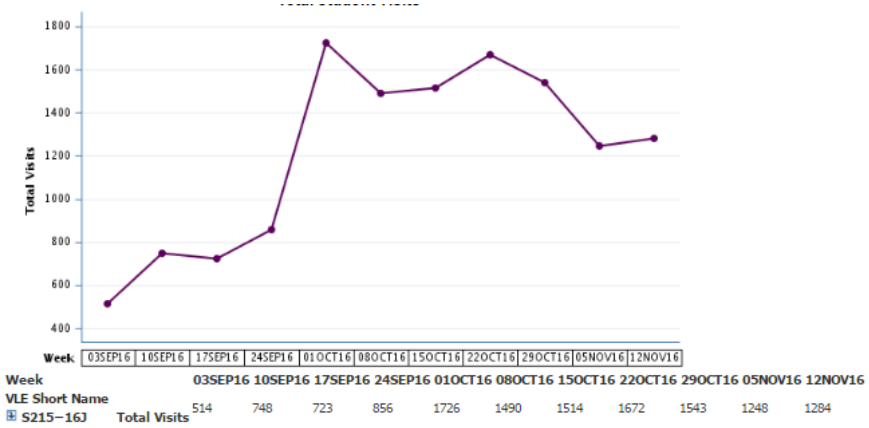
Figure 3. a) Total number clinic website visitors and b) number of unique clinic visitors

As a comparison, the same data obtained from S215 module website is shown in Figure 3.



Week	03SEP16	10SEP16	17SEP16	24SEP16	01OCT16	08OCT16	15OCT16	22OCT16	29OCT16	05NOV16	12NOV16	19NOV16
All Sites VLE Short Name Group Name Is a module site All Users Type of User												
All Sites CHEMCLINIC 0 Site Count All Users Student	87	65	54	50	35	11	7	7	1	3	1	2
All Sites Site Count All Users	87	65	54	50	35	11	7	7	1	3	1	2

a)



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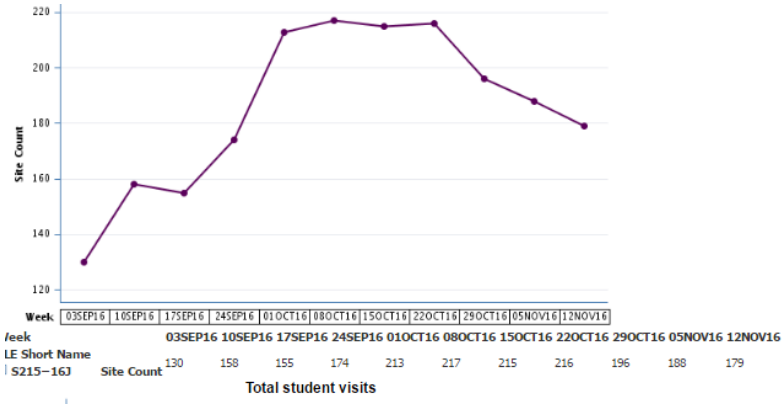

Figure 4. a) Total number S215 16J visitors and b) number of unique S215 16J visitors

Figures 3 and 4 demonstrate clearly that the number of actively engaged students was well below the 150 who visited the clinic website prior to module start. A conservative estimate puts the number of active students to be somewhere between 20-30 (this figure is based on student wiki bookings and other engagement measures such as monitoring visitors to the website etc).

Impact

The direct impact of the clinic on S215 16J presentation is difficult to assess. Each presentation has a different cohort of students, some of which may be better or less well engaged with the module materials inherently, so comparisons with previous years can be problematic. Additionally, there were several other retention measures undertaken by S215 module team during 16J, including reductions to course content and the introduction of assessment weeks. Undoubtedly both these measures would have a positive impact on retention - students would be presumably less likely to fall too far behind and thus drop-out. Bearing this in mind, we must be cautious when drawing direct conclusions on the impact of the clinics. Figure 5 shows a comparison of the student retention for the 16J presentation along with similar data for earlier S215 and S205 presentations.

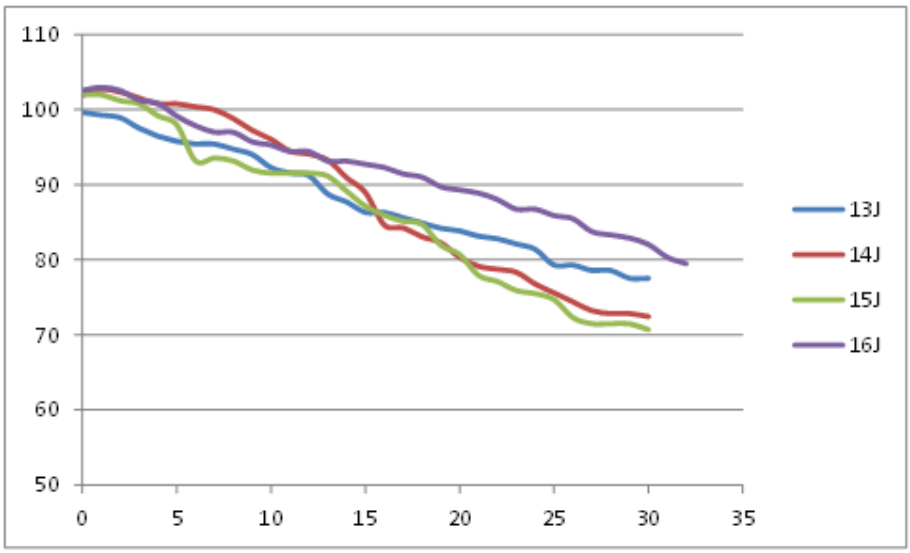

Figure 5. Percentage of retained students (relative to number of students at 25% fee liability date) on a range of level 2 chemistry modules.

Caveats aside, the 16J presentation of S215 was more successful than other presentations, and this may be in part due to the clinic although direct evidence is elusive.

As mentioned earlier, we had plenty of opportunities to disseminate our approach and findings both within STEM and the university more widely. In terms of our projects' impact we could claim that there has been an increase in the number of clinic/bootcamp-type initiatives since 16J! However, we cannot claim to be the sole inspiration for this by any means as there were several other initiatives of similar type being piloted around the same time. Some bridging activities that have started since end of our pilot include:

- S315 "Getting Ready for S315" website and clinic
- S294 "Early start", involving some revision type tutorials
- Bridging activities in Maths and Stats for students transitioning between levels 2 and 3

Figures and Tables

Figure 1. The structure of the clinic website.

Figure 2. a) Total number S215 16J visitors and b) number of unique S215 16J visitors

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