

UNIVERSITY OF GLASGOW

Periodic Subject Review of Chemistry

24 and 25 February 2022

Review Panel

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Overview

Since the last review, the School of Chemistry has built on its strengths, developing its portfolio of UG and PGT programmes, continuing to build on its links with industry and alumni, whilst embedding active learning and employability into the curriculum. The Panel was impressed with the School's commitment to the provision of high quality, research-led and scholarship-led teaching. The School had established the Chemistry Higher Education Research, Practice and Scholarship initiative to enable greater scholarship activity and had also acquired additional physical space within the new Advanced Research Centre, providing dedicated space for some research groups and well-equipped space to accommodate Final Year Projects. The Panel welcomed the strategic approach taken by the School, with considered appointments made in emerging research areas as well as further LTS appointments and its evolving approach towards student-centred, active learning and development of professional skills, which closely aligned with the University's Learning and Teaching Strategy. The Panel recognised many outstanding good practices, which are listed under Sections 9 and 10.

Whilst the Panel recognised the need for the School to make 'firefighting' decisions throughout the pandemic, an extremely difficult period for all, the commitment to providing the best learning experience possible under difficult circumstances was evident. Moving forward and to aid further sustainable development and enhancement, below are several recommendations for the School to consider.

1. Context and Strategy**Context**

1.1 The School of Chemistry is one of six Schools based in the College of Science and Engineering.

1.2 The School offers six UG degree streams and four PGT degrees: three are MSc and one MRes:

- Chemistry (BSc/MSci)

- Chemical Physics (BSc/MSci)
- Chemistry with Medicinal Chemistry (BSc/MSci)
- Materials Chemistry (BSc/MSci)
- Chemistry with Work Placement (MSci)
- Chemical Physics with Work Placement (MSci)
- Chemistry with European Placement (MSci)
- Chemistry with Medicinal Chemistry with European Placement (MSci)
- Chemistry and Mathematics (BSc/MSci)
- Chemistry (MSc)
- Chemistry with Medicinal Chemistry (MSc)
- Chemical Biology (MSc)

1.3 At the time of the writing of the RA, the breakdown of staff by category was:

- 37 R&T
- 8 LTS
- 3 Research Fellows
- 65 Postdoctoral Research
- 30 professional and support staff
- 65 demonstrators

1.4 At the time of the PSR, student numbers were:

- 334 Undergraduates (student numbers capped at 100 due to space restrictions)
- 22 Postgraduate Taught
- 164 Postgraduate Research

1.5 The number of UG student numbers had fallen by 18% over the past few years and while the number of PGT students was small, it has more than doubled over the past four years. It was the intention of the School to proactively increase PGT students.

1.6 At the Review, the Panel met with Professor Justin Hargreaves (Head of School), Dr Charalampos Moiras (Director of Learning and Teaching), 13 Undergraduate (UG) students, 4 Postgraduate (PGT) students and 2 Demonstrators. It further met with a range of academic and professional services staff, covering various teaching and administrative roles and 7 Early Career staff. In the final session, the Panel met with the Head of School, Director of Learning and Teaching, Head of College and Dean (Learning and Teaching).

Strategy

1.7 Significant changes had taken place since the last Review. These included: the introduction of new UG and PGT programmes plus new programmes with Work Placement, creation of additional research space, new strategic staff appointments, improved position in league tables, good NSS results. The Panel **commends** the successes the School has had, particularly during an exceptionally difficult period, gaining re-accreditation with the Royal Society of Chemistry and for achieving exceptional NSS results during the pandemic.

1.8 The Panel **commends** the Strategic approach taken by the School and alignment with the University's Learning and Teaching Strategy, in particular in relation to its evolving approach towards, student-centred, active learning, which included development of professional and transferable skills. The School also aligned with the College strategy in relation to research-led teaching. The presence of the School's research in the ARC

building plus recent appointments would expose students to a wide research environment and the involvement of Final Year students in pedagogical research topics will help to increase the breadth of career opportunities. The Panel further **commends** co-creation of courses in partnership with students, involving students in the annual L&T Conferences and the recently formed Chemistry Higher Education Research Practice and Scholarship initiative, which enabled final year students to engage in teaching related projects, reflecting the School's commitment to scholarly engagement.

1.9 The Panel **commends** the School as it continues to use its well-established links with industry, with students gaining a better understanding of the application of chemistry, including the connection between organic chemistry and practice. The School was also now developing strong links with alumni who could assist with developing relevant graduate attributes further.

1.10 The School had established a table of key indicators to monitor the success of its strategies [RA, Section 2.4]. Key indicators included Recruitment, Enhancing the learning experience, effective assessment, transferable skill development, engagement with industrial partners and careers advice. The Panel considered this to be **good practice**.

2. The Student Experience

Admission and Progression

2.1 At UG level, most students were UK based (86.8%) of 2020 intake. While international student numbers had slightly increased, overall, there had been a small decrease of students from the EU because of Brexit, and it was anticipated that students from the EU would continue to decline as a consequence of this. Although UG student numbers were capped at 100 per year, the School was in consultation with External Relations as to how Chemistry could be promoted and marketed better to enhance recruitment. New programmes such as Chemistry with Medicinal Chemistry, was based on detailed analysis of student selection and it was hoped that the introduction of such programmes would also enhance recruitment.

2.2 Dr C Moiras, the Director of Learning and Teaching, advised the Panel that whilst continuation and progression was not considered a major issue as the retention rate was high, the School was not complacent. The School had appointed an Outreach Champion and had established a Student Recruitment and Experience Committee to enhance recruitment, continuation and progression. The School was also planning on trialing a Peer Mentoring Scheme for Level 1 students.

2.3 The School was proud of the number of its students from a widening participation background, often entering via the Chemistry Summer School route. These students were supported in First Year by the Senior Chief Adviser of Studies.

2.4 The School's ambition was to substantially increase its PGT population with two new PGT programmes recently offered. While numbers were still small (22), this was an increase since the previous PSR. Like the UG population, PGT recruitment would be restricted by capacity for project and laboratory provision. These restrictions were the same as at other institutions. At the meeting with the Head of School, the Panel noted that while the School had gained space in the ARC, space was still a concern for future growth. As such, the School had established a School Space Committee to examine ways of optimising space.

2.5 At the meeting with the PGT students, it was confirmed that they were drawn to study at the School of Chemistry due to the uniqueness of the programme offered (MSc Chemistry with Medicinal Chemistry) as well as the good reputation of the University and the city of Glasgow itself.

Equality and Diversity

2.6 The School had been awarded an Athena Bronze award with a 65:35 male female staff ratio. This was a significant increase in female staff from 22.78% since 2017. Also, since 2017, the percentage of female UG students has increased from 50% to 57.8% which compares favourably to the 34% rate in the College of Science and Engineering (RA, Section 2.2.3). The percentage of female students at PGT level was lower, with 36% of PGT students being female. [Prior to the Review the Panel sought confirmation on male:female ratio of PGR students which was 55.76% male and 44.24% female, of which 70.91% were Home/EU and 29.09% were international.] The School would continue to monitor and promote equality. The School had been introducing more female scientist profiles via social media and electronic noticeboards and have applied to have one of their lecture theatres renamed the Ruth Pirret Lecture Theatre, in honour of the first female to graduate from the University with a BSc and had contributed to the understanding of radioactive decay.

2.7 The School has ensured that laboratories were accessible for disabled students and planned to create personal learning plans for all students registered with the Disability Services. While the Panel did not have an opportunity to discuss this at the Review, this was considered **good practice**.

3. Enhancement in Learning and Teaching

Curriculum design and content

3.1 At the meeting with the Head of School, Professor Hargreaves advised that the School had planned to undertake a complete review of all provision, commencing with the restructuring of Year 3 to provide greater flexibility for Joint Degree provision and therefore greater opportunities. This plan had been on hold due to the pandemic but will commence as soon as it was feasible to do so. The School had introduced the role of Student Experience Champion to review content and procedures of all courses with a view to identifying areas for improvement including course structure, content and delivery. The Student Experience Champion would also monitor student engagement with courses and assist students with course selection. The Panel **commends** this appointment to understand course selection and delivery from the student perspective.

3.2 The School was committed to providing research-led teaching with recent appointments in emerging research areas of Chemical Biology and Precision Synthesis, Chemical Photonics, Complex Chemistry, Energy Conversion and Storage and Heterogeneous Catalysis. At the meeting with the Head of School and Director of Learning and Teaching, the Panel's attention was drawn to the introduction of Chemistry with Medicinal Chemistry. This was established following detailed analysis of student selection. [see 2.1] It also provided an opportunity to both exploit the School's links with industry as well as provide students with an opportunity to link organic chemistry with practice. The Panel **commends** the School's vision and strategic approach to breadth of appointments, ensuring its teaching was relevant and up to date.

- 3.3 Visibility of research in teaching was discussed with the Head of School and with staff where it was indicated that research was embedded in teaching. There were also some specific research exercises, such as Frontiers of Chemistry in Year 3. Chemistry with Medicinal Chemistry was highlighted as an example of students being exposed to cutting edge research and industry working in Virus Laboratories. Year 3 courses contained cutting edge research and Year 2 had interactive research-based exercises, but all lectures would introduce research material whenever relevant.
- 3.4 At the meeting with the Demonstrators, the Panel's attention was drawn to the Alchemist Society which exposed undergraduates to research being undertaken. The Panel was also advised that more final year students were continuing with further study due to the supportive environment established within the School as well as the global reach of the School. The pandemic had shown students the impact of chemistry on global issues and potential career opportunities. The new building would also have a positive impact, giving more space to Final Year students.
- 3.5 As mentioned under 1.9, the School has strong links with industry and strived to embed appropriate relevant skills in teaching to ensure students were equipped to address current and future challenges. The School worked closely with industry and increasingly with alumni, with a strong focus on ensuring students developed appropriate graduate attributes. The School interacted with industry and alumni who provided feedback on the required graduate attributes. This took place after the student placement period. At the meeting with the Head of School, Professor Hargreaves advised the Panel on positive feedback received from employers on the quality of their students. The School planned to introduce more formal opportunities of working with alumni. The Panel **commends** the coherent and well-structured work-related learning and links with employability and increasing use of alumni providing opportunities for students to make an impact on the outside world.
- 3.6 At the meeting with Early Career Staff (ECS), the Panel was informed that there was opportunity to develop courses but there was uncertainty as to what other courses offered and how to avoid duplication was unclear. Autonomy was good but there was no thematic coherence and therefore it could feel sectional and random. However, ECS had been invited to participate in the new review which offered a holistic approach to the curriculum. ECS confirmed that it was a strong research School with research-led teaching and learning a strong theme. The Panel considered the ECS it had met with to be strongly committed to linking research with teaching and introducing more innovative courses and teaching practices and encourage the School to involve ECS in the wider review of the curriculum.

L&T Delivery

- 3.7 The sudden onset of the pandemic and short timeframe to move to online delivery had been extremely challenging. But with the help of colleagues, within the School, College and University (see Section 3.21) staff had successfully moved all its teaching and assessment online. Online learning included using platforms such as Moodle, Teams and Padlet. Students were provided lecture notes in advance to allow for flexibility and greater engagement with lectures. Interactive engagement was also encouraged by using TopHat

and Mentimeter, more active learning platforms, resources designed to provide a deeper understanding of lecture material and the Panel considered this to be **good practice**.

3.8 While the UG and PGT students confirmed that they found online resources useful and welcomed the flexibility and breakdown of information into manageable sections, they preferred on campus teaching. The lack of structure was considered particularly difficult. At the meeting with Early Career Staff, while the online lectures were deemed essential at the time, interaction with students was deemed different and had a knock-on impact on tutorial and Q&A attendance. Staff and students appeared to have had different expectations and there was a need to better communicate the amount of self-directed learning required to be undertaken. As highlighted in the Reflective Analysis (RA), moving forward, consideration would be given to what elements of online learning and teaching should be retained to enhance or complement the student learning experience as on campus teaching returns. Whilst, both staff and students found online classes less engaging than on campus, lecture recordings were considered useful for supporting learning. There was now an opportunity to consider optimum learning and teaching delivery with the potential to develop more active learning for on campus delivery, supplemented by online material.

3.9 In general, the UG students the Panel had met found the e-labs better this semester than last year as the structure had been modified and split into sections. The Pre-labs were seen as a valuable resource; however, they were still considered less engaging than face-to-face. Laboratories required practical application to better retain the information. The UG students drew attention to the Moodle quizzes not linking to the laboratory information and, unlike in person laboratories, there were no Demonstrators available to ask for advice. However, the students understood the restrictions the School was working under and drew attention to the positive aspect of e-labs and online learning which was flexibility and accessibility. The students welcomed lecture recording as a learning tool and hoped this would continue to be offered as restrictions ease. The students also recommended that the e-labs could be a useful pre-lab resource.

3.10 The PGT students the Panel met with, indicated that courses were lecture heavy in the first semester. Due to the on-line nature of lectures, students found it difficult to establish relationships with staff, and therefore found it difficult choosing a supervisor. In person was considered easier to ask a question at the time of the lecture rather than following it up after. However, one advantage of online was the flexibility it offered, and students proposed that blended activity might work best, if the 'blend' was right. Considering all of the points raised under 3.8 to 3.10 the Panel **recommends** that moving forward, the School develops a clear and transparent approach to delivery, learning support and assessment including contact time and expected level of self-study.

3.11 Due to the pandemic, Moodle had been extensively used with an increased amount of online material provided. The RA indicated that the School used Moodle (VLE) as a one-stop shop for student communications and as a repository for course information, online textbooks and other online materials (Section 2.5.3). The School was also moving towards all assignment submission via Moodle with feedback provided electronically. Whilst the Panel welcomed these developments, Moodle was not being used in terms of active pedagogy. The Panel had access to the course Moodle pages, which were considered difficult to navigate where it was evident that pages had developed organically over time. At the meeting with the UG and PGT students, both set of students indicated that whilst

Moodle provided good course information and guidance, they confirmed that it could be difficult finding information as course pages were inconsistent. For PGTs new to the University, it took time to become familiar with Moodle and that it was not intuitive. Information was perceived to be disjointed and not consistent and effort was required to find information. Communications in general could also be inconsistent. Some of the UG students had courses in other Schools whose Moodle pages were more intuitive and useful. Accessibility issues related to Moodle pages was discussed with staff. Experience of Moodle had been limited prior to the pandemic and due to lack of administrative support it had been difficult adjusting pages to come into line with accessibility due to time constraints. The Panel **recommends** that the School establishes a small working group, extending membership to include staff from Academic and Digital Development (ADD) and staff with extensive Moodle experience from across the College to restructure Moodle to provide a more user-friendly and accessible interface. This should include consideration of developing a template that would provide structure consistency thereby enabling easier navigation. The working group should further explore Moodle capabilities and the additional benefits this could have on active learning as well as student support, such as announcement pages. An appointment of a student intern to support development should also be considered to ensure Moodle was an effective and usable learning resource and communication tool for students.

3.12 The Panel noted the number of regular nominations and awards received in Teaching Excellence Awards and Student Teaching Awards and the number of regular contributions to the University's Annual Learning and Teaching Conference. This demonstrated staff commitment to providing excellent teaching and a good student experience.

Graduate Attributes and Employability

3.13 Historically, the School had worked hard to develop graduate attributes and employability with students given opportunities to develop professional and general transferable skills. Sections 2.2.1 and 3.2 of the RA highlighted that all courses were designed for students as active learners, engaged in discussion, problem solving, teamwork/collaborative type scenarios in business or research environments. Skills Development workshops had also been introduced to provide students with an opportunity to engage with companies with industry focused problem solving and Q&A sessions designed by Industrial partners. The MSci with Work Placement was an excellent opportunity to develop skills gaining direct experience in industry. Such placements also raised the University profile, with employers highly praising the quality of the students. Employers had confirmed that the School was producing well rounded graduates with excellent transferable skills. At the meeting with staff, they acknowledged that they could do better at promoting the skills being developed. As discussed under 1.9 and 3.4 the Panel **commends** the graduate attributes skills being developed and encourages the School to promote the breadth of skills being developed to its students in a transparent and coherent structure, using the Graduate Attributes matrix.

3.14 The School had well established links with the Careers Services, which ran workshops, highlighting those transferable skills which could be applied in a broader range of career paths. Links with alumni were also being developed with interaction with current students. As 2022 was the 275 Anniversary of the School, a selection of career-related

presentations ran delivered by alumni and, depending on student feedback, this may become a regular event. Two final year projects were examining student attitudes to careers and what influenced choice of degree and personal development planning [RA, Section 2.6]. The Panel **commends** the exposure to scholarly activity in the Final Year education-based projects offering potential for new aspects of the curriculum, co-created between staff and students.

Assessment

- 3.15 The School used a diverse range of methods to assess student performance, including laboratory reports, tutorial work, short tests, essays, oral and poster presentations. However, there was a heavily weighted (85%) final examination. Whilst continuous assessment can place additional stress on students, the Panel queried whether a balance could be reached between stress and single point of failure. At the meeting with the Head of School and Director of Learning and Teaching, it was confirmed that the School was open to consider the option to split assessment across the semesters which would also allow for assessing topics in more depth. The Panel **recommends** that, following this Session's examination period, the School undertakes a review of assessment, specifically the use of the heavily weighted final examination, and whether the weighting is still considered appropriate by establishing a clear set of definitions as to what skills the exam is testing ensuring students are meeting the ILOs. The Academic Development Unit could provide support.
- 3.16 Whilst the School was keen to move back to on campus examinations, the Final Year students the Panel met with were particularly concerned regarding the move back to on campus examinations. This was mainly due to the late notification and the potential additional stress this would cause. The main concern regarded the perception that the different skill set required to be demonstrated varied between online and exam hall format, with students having limited experience of the latter, now more familiar with the online examination. Stress was heightened as the final year examination was heavily weighted (85%). The Panel **recommends** that the School establishes a clear line of communication with its students and provides relevant practice opportunities to ensure the students are confident in demonstrating the skills they have attained.
- 3.17 At the time of the Review, the PGT students had not yet been informed of the exam format and whether it would be online or in person. The students advised that the shift to online examinations had been difficult to adjust to due to unfamiliarity with the format. There was also concern over academic integrity. However, one of the students found in-person exams more stressful and thought well managed online exams should work better.
- 3.18 While there was preference for on campus examinations, at the meetings with Head of School and Director of Learning and Teaching and with staff, the Panel was advised that online assessment had worked well in Year 1. These examinations had been multiple choice type exams, including videos of models and worked answers.
- 3.19 At the meeting with staff, there appeared to be some misconception concerning the online examination format that the School was required to adopt when alternative formats had been available. This may have been due to miscommunication and therefore the Panel **recommends** that the School and College consider how best to share central

and College communications, whilst also establishing clear lines of communication with its students, such as the Announcement page on Moodle as discussed under 3.11.

3.20 At the Student Focus group held by the Student Panel member with class representatives, feedback was received that the class test was perceived to be easier than the exam. However, the Director of Learning and Teaching advised that the class tests correlated to what was assessed in the exam, the only difference being that the class test was shorter. The main purpose of the class exam was to ensure students engaged in the learning process throughout the year. The exam tested work undertaken in both semesters, but the questions were comparable.

3.21 Prior to the pandemic, External Examiners had highlighted the low distribution of First-Class degree classifications. However, during the pandemic, both the RA and External Examiners drew attention to the substantial increase of First-class degrees awarded. The Panel acknowledged that, in the first year, this was a consequence of a sudden change to online examinations without the opportunity to amend the exam format; the No Detriment policy had also had an impact. At the meeting with the Head of School and Director of Learning and Teaching, in response to criticism of low distribution of First-Class degrees, additional support mechanisms in mathematics had been introduced to address this and due to the pandemic, there had not been an opportunity to assess the impact of this. The move to online examinations had been difficult as the type of exam Chemistry held was not well suited to online and the timescales and pressure on staff during the pandemic did not allow for sufficient re-formatting. At the meeting with staff, it was acknowledged that appropriate measures had not been put in place, but staff had done their best under the circumstances. Staff had not been happy with the decisions made at University level but recognised there were limited alternatives with it being a difficult period for everyone. It was anticipated that the high distribution would be re-addressed with the move back to on campus examinations this Session. The Panel **recommends** that the School continues to monitor and consider further how to avoid bunching with consideration given to possible recalibration with the School establishing clear classification descriptors. The high weighting placed on the final year examination also had an impact on the final outcomes and this could be considered as part of the review of assessment as referred to under 3.8. The Panel further **recommends** a mechanism be put in place for setting different types of examinations and for reviewing prior to submission to External Examiners to ensure questions set are appropriate for the type of exam. A group could reconvene to review marks if marks were deemed out of line and calibrate as necessary, allowing for more control over variation of exams set. The Panel suggests establishing a peer review system for staff to critically appraise each other's questions.

3.22 The External Examiner reports referred to potential lenient marking of students on Work placement had been highlighted. This was discussed at the meeting with the Head of School and Director of Learning and Teaching who confirmed that the School was working with companies and partner universities to ensure the marking criteria were clear and that robust procedures were in place. A single academic contact visits sites and offers pastoral support as well as to ensure consistency of assessment. Whilst the Panel acknowledged the challenges of consistency, it **recommends** that the School continues to review marking for students on work placement and work closely with employers to ensure it is satisfied with the academic quality and standard of marking.

Assessment and Feedback

- 3.23 The RA referred to assessment being closely mapped to Intended Learning Outcomes (ILOs) and the Panel sought further information on this. It was confirmed that no specific software was used for this but a case of ensuring all ILOs were appropriately assessed. The Panel agreed mapping assessment to Intended Learning Outcomes was good practice.
- 3.24 The RA highlighted [Section 2.5.3] that clarity and transparency of assessment and feedback was enhanced with the introduction of A&F Calendars. Project and Placement assessment forms had also been redeveloped using the 22-point scale and associated verbal descriptions and these were published to students at the start of the academic year.
- 3.25 The RA (section 3.4) drew attention to the provision of both formative and summative feedback, with a Year 3 practice exam introduced, which has a follow up pastoral meeting with the class head (or deputy) to discuss performance and support. Dedicated tutorials were also provided prior to the final degree examination. The Panel considered this to be **good practice**.

Supporting staff

- 3.26 At the meeting with staff, the Panel sought feedback on the support they received during the pandemic and the sudden switch to online. Staff confirmed that it had been challenging for all staff, but a few staff with more advanced technological experience had provided substantial support to colleagues. Staff in Academic Digital Development, IT Services, the Library and Flexible Learning Leads from other Schools had also helped, which had been greatly appreciated. The Library had ensured online textbooks were available with IT Services supporting the move to online exams and Moodle quizzes. The support provided by the Dean of Learning and Teaching had also been appreciated. It had been a substantial effort and source of stress but going forward, staff were more confident in their IT capabilities and agreed that some form of online provision should continue as a valuable resource to supplement on campus learning. Fundamentally, due to the very nature of laboratories, these had to be on campus, but materials created for online would be used for pre-lab preparation.
- 3.27 The RA had highlighted exceptional work carried out by staff and it was evident to the Panel that many staff were an asset to the School, but the Panel sought reassurance at the meeting with the Head of School and Director of Learning and Teaching that the School was not over reliant on some of the staff named in the RA. The Panel highlighted that some comments collated from the PSR Staff Survey indicated uncertainty over the role of teaching for staff on R&T contracts with research perceived as having priority. At the meeting with staff, it was acknowledged that the pandemic had forced staff to 'firefight' over the last 2 years, with time now required to rebalance priorities and to have space to consider and develop both teaching and research. It was unclear as to what the implications might be for staff not being able to undertake research. Staff found teaching development difficult to measure and better ways of reward and recognition was required to capture effort. In relation to promotion, staff considered the R&T criteria for promotion were clearer than those established for the LTS track. For some staff, LTS staff felt undervalued. Support for scholarship activity had been well received but required considerable effort on top of heavy teaching loads. The Head of School confirmed that the

School was reviewing the balance of activities and planned to distribute duties to enable greater opportunities for scholarship activity to enhance promotion opportunities. The Panel **recommends** that the School should clarify and make transparent to all staff the value of all aspects of the job, including how teaching and scholarly activity was rated in promotion criteria.

- 3.28 Comments in the staff survey also indicated that staff had heavy administrative workloads, even with the additional administrative appointments. At the meeting with the Head of School, it was drawn to the Panel's attention that the lack of promotion opportunities for administrative staff was problematic and experienced staff left the School for promoted posts elsewhere. However, support was better than before and more systematic processes, such as assignment submission via Moodle could help alleviate some administrative burden from academic staff.
- 3.29 Section 3.11 of the RA highlighted the numerous ways the School formally and informally shared good practice including the First Year Coordinators Meetings, Second Year Science Coordinators Forum and the recent establishment of the School of Chemistry Community of Practice forum. The Panel welcomed these developments and opportunities for staff to share experiences and good practice.

Support for Early Career Staff

- 3.30 At the meeting with Early Career staff (ECS), the Panel was advised that the transfer to online learning, teaching and assessment whilst continuing to undertake the PGCAP had been difficult. However, it was acknowledged that the course on using technology in learning had been especially useful. Also, staff undertaking the PGCAP had a greater empathy towards their own students' experience; after spending time as a student themselves. The Asynchronous approach helped manage time and the move to online but spreading out submission deadlines could be considered. It was also suggested that it would be useful to meet staff from across disciplines and recommended more structured networking.
- 3.31 Early Career staff were mentored by a senior academic member of staff with the PDR process used to monitor progress and discuss support (Section 3.9, RA). However, ECS indicated that, the quality of mentoring varied and, in general, they learned on the job about how to become a better academic. Milestones on how to progress were not transparent. At the final meeting with the Head of School, the Panel was advised that there was a plan to address inconsistencies.
- 3.32 It was unclear to the Panel how well supported staff on the LTS track were and what ongoing support was provided to early career staff. Early career staff indicated that while they found the PGCAP useful, the relevance and opportunity for development for LTS staff on the Early Career Development Programme (ECDP) was unclear. Those staff on the MEd found this supported scholarship activity better. The Panel would bring this to the attention of Academic and Digital Development, but the Panel also **recommends** that the School establishes a network for LTS, such as a Community of Scholarship to ensure LTS staff have access to ongoing support as well as ensure they have a 'voice'.

Support for Demonstrators

- 3.33 The RA highlighted that a GTA training programme had been introduced that included an Induction session, enabled GTAs to practice the experiments prior to the laboratories taking place and provided feedback on GTA performance with guidance from the School's Learning and Teaching Committee. However, at the meeting with the 2 Demonstrators, it was indicated that lab demonstrations had not taken place prior to the labs. The Demonstrators agreed that an opportunity to go over experiments in advance would be beneficial to ensure they were prepared. It was also suggested that it would be helpful to be given a range of questions that potentially could be asked of them to enable them to better support the students. Some additional material to read up on would also help the Demonstrators support students better. One of the Demonstrators indicated that there was a substantial jump between Year 1 and Year 2 laboratories and Year 3 and some advanced discussion beforehand would be valued. It was drawn to the Panel's attention that the lack of technical support had been difficult with only one new technician providing support. There was a bedding in period, but this settled down as the new member of staff became familiar with the environment. Whilst the Panel recognised that they had only met with 2 out of 65 Demonstrators based in the School, the Panel **recommends** ensuring additional pre-lab support is given in accordance with the GTA training programme. This should include providing an opportunity for Demonstrators to go over experiments in advance, be given additional reading material and given guidance on what questions Demonstrators may be asked by students.
- 3.34 The Demonstrators the Panel met with advised that they marked video presentations and lab reports but were not involved in examinations. The Demonstrators advised that the marking timeframe was good. However, during discussion of the marking scheme and use of the 22-point scale, there were elements of general misunderstanding of the criteria and therefore the Panel **recommends** that further guidance be provided in relation to marking and assessment and how to apply the assessment criteria.
- 3.35 The Demonstrators advised that there were good opportunities for peer mentoring and support and there was a good balance of teaching and assessment which fitted well with studying. There was flexibility in choice for undertaking lab work. Demonstrators were also invited to provide feedback to lab heads at the end of the labs on how to improve. Demonstrators had an opportunity to talk to students and share experiences, particularly with those students who had undertaken a work placement.

4. Student Support

- 4.1 The RA (Section 3.3.1) highlighted that support was embedded into Level 1 courses for students with advice given on study techniques and what was expected from students. All Level 1 courses included short tests to help staff and students identify any issues early. Students were given feedback and voluntary revision tutorials were organised. Students were also encouraged to attend workshops run by the College Effective Learning Adviser. A peer mentoring scheme was also being introduced by the Student Support Officer. The Student Support Officer (SSO) was a College appointment and had been in the role since 2021. The SSO worked closely with Advisers and offered a first point of contact and initiated interventions depending on the student's individual situation. The School also had two Mental Health First Aiders. All information and accompanied links to services

were included in course Moodle pages. The School had established good links with various College and University support services (including Student Learning Services, Disability Counselling and Psychological Services) which the Panel considered to be **good practice**.

- 4.2 The School had developed several initiatives to provide additional support in both mathematical and academic essay writing skills, which was in addition to the compulsory academic writing skills programme provided by Student Learning Development (SLD). Essay writing now formed part of Level 2 and 3 assessments, which helped prepare students for Final Year projects. The School had developed a Science Skills course in partnership with three Final Year students. The students had developed teaching resources for First Year students as part of their projects. This included the creation of a Maths learning resource, regardless of their pre-university maths qualifications. The Panel **commends** the student staff partnership in the development of the Science Skills course which was an excellent initiative and encourages the School to continue to use such partnerships.
- 4.3 The School's library had been modernised and now included quiet space for students with PGT students having out-of-hours access. Whilst the Panel did not have an opportunity to discuss this with the students, the Panel welcomed this development.
- 4.4 The RA further highlighted several formal and informal mechanisms to support students (Section 5.1). The School had an 'open door policy' with students encouraged to drop-in to chat with a member of staff. During the pandemic, 'drop in' support was available via Microsoft Teams or by email. The Panel considers this to be **good practice**.
- 4.5 Whilst the UG and PGT students had found the Q&A sessions useful, both groups of students suggested scheduling later in the semester rather than mid-way as they were still coming to grips with the course.
- 4.6 The formal Advisory support was also highlighted in the RA (Section 5.2) where 18 members of academic staff acted as Adviser of Studies. The RA indicated that students should have two yearly appointments with their Adviser to discuss progress and course choice as well as ensure students were made aware of central support services available. The Panel discussed the effectiveness of the Advising system with the UG and PGT students it had met with. Whilst some students highly rated the support received, others did not, with inconsistencies of experience highlighted. One student expressed concern over the lack of support or signposting to support when they had experienced personal difficulties. Another student stated that no responses were received to any emails they had sent. The PGT students indicated that the role was not visible, with one student unsure as to whether they had met with an Adviser of Studies. The students were also not aware of the new Student Support Officer and suggested that this role was promoted. Due to some inconsistencies in support provided by Advisers of Studies, the Panel **recommends** reviewing the Adviser of Studies system, in consultation with students. This could be part of a wider review of all student support mechanisms to make more effective the visibility and clarity of routes to take when a student requires support. In addition, the Panel **recommends** that all student support mechanisms are clearly signposted. This should include the role of the Adviser of Studies, role of Class Head, the new Student Support Officer, the new Student Experience Champion and the College Effective Learning Adviser.

5. The Student Voice

Responding to student feedback and closure of the feedback loop

5.1 At the meeting with the UG students, it was confirmed that students were given an opportunity to raise issues at Staff Student Liaison Committees (SSLC) but there was a sense that feedback was not always acted upon. For some class representatives, the lack of responsiveness had left them feeling deflated, especially when they had taken time to gather student opinion and feedback. The PGT students advised that although class representatives were given an opportunity to raise issues, SSLCs could be overly formal and that a conversation-style format could be more conducive. To ensure closure of the student feedback loop, the Panel **recommends** including follow up activity to issues raised at SSLCs be minuted with a clear set of actions assigned to staff members which are formally closed off at the next meeting. Minutes and actions should also be clearly signposted in Moodle for all students to view. Furthermore, the Panel **recommends** that the School considers reviewing the structure of SSLCs. Currently, they were large and possibly dividing between Honours and Non-Honours would enable more focused meetings and targeted action.

5.2 The RA (section 3.6) drew attention to the lack of effectiveness of the University's (EvaSys) Course Evaluation and that the School had previously used a more robust system of in-house evaluations. It was unclear to the Panel as to why the EvaSys software would be less effective and questioned whether evaluation was being undertaken online and during class time to enhance participation rates. The Panel was also aware that no Summary Response Documents had been provided, a core requirement of the Course Evaluation policy being to provide feedback to responses received to ensure closure of the feedback loop. The Panel **recommends** that Summary Response Documents are provided following course evaluation and made available to SSLCs and posted on Moodle. If there are any reasons why changes cannot be made, this should also be clearly communicated. The Panel further **recommends** undertaking course evaluation during class time. Both practices should also improve participation rates.

National Student Survey (NSS)

5.3 The School was right to be pleased with the significant increase in satisfaction rates in the NSS (Section 3.10, RA) with the overall satisfaction rate increasing to 92.1% in 2021. the highest score in the College of Science and Engineering. This was particularly impressive due to the survey being undertaken during the pandemic. Taking on board the recommendations raised under 5.1 and 5.2, it was hoped that the School should also see an increase in the satisfaction rates for the Student Voice.

6. Collaborative Provision

6.1 Whilst the School had established a 2+2 partnership with Beijing to improve internationalisation, moving forward with this had been hampered by the pandemic. However, the contract has been renewed and the School was pro-actively developing some research links with a member of staff, now based there, who had been a former post-doctoral student from the School. However, the Panel noted that the lower IELTS entry requirements at other institutions was considered to have a negative impact on admission to the School.

6.2 There were plans to develop a course with Leuphana, Germany, with whom the School had strong mutual interests. While there were issues related to course structure and fee status, these were expected to be resolved.

6.3 An arrangement had been put in place with Northeastern University in the United States with 100 students expected to come to the School as visiting students.

7. Academic Standards

7.1 The Panel **confirmed** there were no concerns regarding the academic standards of programmes delivered by the School of Chemistry and recommended the validation of all programmes for a further six years.

7.2 The Panel **confirmed** the School had a transparent academic governance and quality assurance structure which aligns to the University regulatory framework. The RA (section 3.7) highlighted that the School's L&T Committee met monthly, as did the L&T Management Committee. The L&T Committee comprised all class heads, Head of Teaching, Sectional Heads, Laboratory Heads (as required), Project and Placement Head and Quality Officer. Regular meetings ensured issues arising were dealt with quickly.

7.3 The School has been re-accredited by the Royal Society of Chemistry for satisfying the academic requirements for the award of Chartered Chemist (CChem) for the BSc (Hons), BSc and MSci. The new UG degree programmes would apply for accreditation at the next scheduled accreditation in 2025.

7.4 External Examiners play a vital role in relation to academic standards and consulted on course and programme design, assessment including examinations. The School also invited External Examiners to speak with staff and students twice a year which the Panel considered as **good practice as this was not standard practice**.

8. Summary

The School demonstrated a genuine commitment to providing research-enhanced teaching, whilst the pandemic had been severely disruptive to learning and teaching, the School adapted quickly. Moving forward and gradually out of an online dominated teaching landscape the School should continue to have meaningful discussion on the positive elements of online learning. Over the last 2 years, the School has developed a wide range of well-structured and high-quality online materials to complement the student's learning experience. The School provides a wide range of assessment methods to enhance transferable skills, however, it still has a final exam worth 85% and the School should consider if this is an appropriate balance and reflection of their students' abilities, as well as address concerns raised by the RSC and External Examiners on lower degree classification rates¹. The School is to be congratulated on its strategic approach to learning and teaching and its focus on graduate attributes developing with industry and growing links with alumni, ensuring that its students have the optimal learning experience and will be well respected graduates.

9. Commendations

The Panel **commends** the School on the following

¹ Out with the pandemic period

- The successes the School has had, particularly during an exceptionally difficult period, gaining re-accreditation with the Royal Society of Chemistry and for achieving exceptional NSS results during the pandemic.
- The strategic approach taken by the School and alignment with the University's Learning and Teaching Strategy, in particular in relation to its evolving approach towards student-centred, active learning, which included development of professional and transferable skills.
- The School's vision and strategic approach to breadth of appointments, ensuring its teaching was relevant and up to date.
- The graduate attributes skills incorporated into courses and the Panel encourages the School to promote the breadth of skills being developed to its students in a transparent and coherent structure.
- Well-established links with industry with students gaining a better understanding of the application of chemistry, seeing the connection between organic chemistry and practice. The coherent and well-structured work-related learning and links with employability and increasing use of alumni provided opportunities for students to make an impact on the outside world.
- The development of strong links with alumni who could assist with developing relevant graduate attributes further.
- The exposure to scholarly activity in the Final Year education-based projects offering potential for new aspects of the curriculum. Co-creation of courses in partnership with students and involving students in the annual L&T Conferences and the recently formed Chemistry Higher Education Research Practice and Scholarship initiative which enabled final year students to engage in teaching related projects, reflecting the School's commitment to scholarly engagement. In particular, the student staff partnership in the development of the Science Skills course which was an excellent initiative, and the Panel encourages the School to continue to use such partnerships.
- The introduction of the role of Student Experience Champion to review content and procedures of all courses with a view to identifying areas for improvement including course structure, content, delivery and student engagement.

10. Good Practice

- The establishment of key indicators to monitor the success of its strategies.
- Personal learning plans established for all students registered with the Disability Services.
- The introduction of Year 3 practice exam and follow up pastoral meeting with the class head (or deputy) to discuss performance and support. Plus, dedicated tutorials provided prior to the final degree examination.
- Good links established with various College and University support services (including Student Learning Services, Disability Counselling and Psychological Services).

- 'Open door policy' which encouraged students to drop-in to chat with a member of staff. During the pandemic, 'drop in' support was available via Microsoft Teams or by email.
- External Examiners play a key role in relation to academic standards consulted on course and programme, assessment including examinations . The School also invited External Examiners to speak with staff and students twice a year.
- In line with the Recording of Teaching Policy, the Panel considers the provision of recordings to students as inclusive.
- Using interactive learning platforms like TopHat and Mentimeter to provide a deeper understanding of online lecture material.
- Mapping assessment onto Intended Learning Outcomes

11. Recommendations for Enhancement

The table of recommendations for enhancement is attached.

PERIODIC SUBJECT REVIEW OF CHEMISTRY

RECOMMENDATIONS

Recommendation	Enhancement in Learning and Teaching	Enhancement Benefits	For the attention of
1.	There appeared to be some misconception concerning the online examination format that the School was required to adopt when alternative formats had been available. This may have been due to miscommunication and therefore the School and College should consider how best to share information received from central internal communications and from College, whilst also establishing clear lines of communication with its students. Such as the Announcement page on Moodle as discussed under recommendation 10 [3.19]	Better lines of communication will enhance both the staff and student learning and teaching environment.	Head of School For information: Dean (L&T)
2.	The Final Year students the Panel had met were particularly concerned regarding the move back to on campus examinations and the potential additional stress this would cause. The main concern regarded the perception of the different skill set required to be demonstrated varied between online and exam hall and students now had limited experience of the exam hall format, now more familiar with the online examination. Stress was heightened as the final year examinations were heavily weighted (85%). The Panel recommends that the School establishes a	Clearly defined skills sets being examined will not only enhance student learning but could provide the School greater flexibility and variety for assessing its students. Clarity and transparency of ILOs will enable students to recognise ILOs in their assessment,	Head of School, Director of Learning and Teaching and Head of ADD

	<p>clear line of communication with its students and provide relevant practice opportunities to ensure the students are confident in demonstrating the skills they have attained. [3.16]Following this Session’s examination period, the Panel recommends that the School undertakes a review of assessment, specifically the use of the heavily weighted final examination, and whether the weighting is still considered appropriate by establishing a clear set of definitions as to what skills the exam is testing ensuring students are meeting ILOs. The Academic Development Unit could provide support. [3.16]</p>	<p>leading to better student satisfaction rates</p>	
3.	<p>Prior to the pandemic, External Examiners had highlighted the low distribution of First-Class degree classifications, while both the RA and External Examiners drew attention to the substantial increase of First-class degrees awarded during the pandemic. The Panel acknowledged that, in the first year, this was a consequence of a sudden change to online examinations without the opportunity to amend the exam format; the No Detriment policy had also had an impact. While the final year examination was moving back to exam halls this Session, the School should continue to monitor and consider further how to avoid bunching with consideration given to possible recalibration with the School establishing clear classification descriptors. The high weighting placed on the final year examination also had an</p>	<p>To ensure fairness and maintain academic standards</p>	<p>Head of School and Director of Learning and Teaching</p>

	<p>impact on the final outcomes and this could be considered as part of the review of assessment as referred to under recommendation 2 . The Panel further recommends a mechanism be put in place for setting different types of examinations and for reviewing prior to submission to External Examiners to ensure questions set are appropriate for the type of exam. A group could reconvene to review marks if marks were deemed out of line and calibrate as necessary, allowing for more control over variation of exams set. The Panel suggests establishing a peer review system for staff to critically appraise each other’s questions. [3.21]</p>		
4.	<p>From the External Examiner reports, potential lenient marking of students on Work placement had been highlighted. The School continues to review marking for students on work placement and work closely with employers to ensure it is satisfied with the academic quality and standard of marking. [3.22]</p>	<p>To ensure academic standards are maintained</p>	<p>Head of School and Director of Learning and Teaching</p>
5.	<p>As highlighted in the Reflective Analysis, consideration should be given to what elements of online learning and teaching should continue to enhance or complement the student learning experience as on campus teaching returns. The School should develop a clear and transparent approach to delivery, learning support and assessment including contact time and expected level of self-study. [3.10]</p>	<p>To enhance the student learning experience</p>	<p>Head of School And Director of Learning and Teaching</p>

6.	It was unclear to the Panel how well supported staff on the LTS track were and what ongoing support was provided. Early career staff indicated that while they found the PGCAP useful, relevance and opportunity for development for LTS staff on the Early Career Development Programme (ECDP) was unclear. The Panel will bring this to the attention of Academic and Digital Development, but the Panel also recommends establishing a network for LTS, such as a Community of Scholarship to ensure LTS staff have access to ongoing support as well as enable them to have a 'voice'. The School should also make transparent to all staff the value of all aspects of the job, including how teaching and scholarly activity is rated in promotion criteria [3.32]	Supporting staff development	Head of School Deputy Director of ADD
7.	Whilst the Panel recognised it had only met with 2 out of 65 Demonstrators, it was indicated, that lab demonstrations had not taken place prior to the labs. In accordance with the GTA training programme, the Panel recommends ensuring additional pre-lab support was given. This should include an opportunity to go over experiments in advance, be given additional reading material and given guidance on what questions the Demonstrators may be asked by students. Further guidance should also be provided in relation to marking and assessment and how to apply the assessment criteria [3.33 and 3.34]	Better trained Demonstrators, providing consistent support and marking thereby providing better support for students.	Head of School For information: Dr Kimberly Wilder- Davies (ADD)

	Enhancing the Student Experience	Enhancement Benefits	For the attention of
8.	<p>Due to some inconsistencies in support provided by Advisers' of Studies, the formal Advising of Studies system should be reviewed in consultation with the students. This could be part of a wider review of all student support mechanisms to improve and make more effective as well as give visibility and clarity of route to take when a student requires support [4.6]</p> <p>In addition to recommendation 8, clearly signpost all student support mechanisms provided. This should include the role of the Adviser of Studies, Role of the Class Head, the new Student Support Officer, the College Effective Learning Adviser, the new Student Experience Champion [4.6]</p>	<p>Better supported students leading to higher rates of student satisfaction</p> <p>Effective ways of supporting students and raising awareness of support. Should reduce individual queries to staff</p>	Head of School
9.	<p>Restructure Moodle to provide a more user-friendly and accessible interface. Consideration should be given to developing a template that will provide structure consistency thereby enabling easier navigation. Explore Moodle capabilities such as announcement pages. To take this recommendation forward, the Panel recommends establishing a small working group extending membership to include experienced staff in Moodle from across the College and from Academic and Digital Development (ADD). [3.11]</p>		Head of School
	The Student Voice	Enhancement Benefits	For the attention of
10.	<p>Ensure the closure of the student feedback loop by ensuring follow up activity to issues raised at SSLCs</p>	<p>Providing clear communication on</p>	Head of School

	is carried out and minuted. Similarly, in line with the Course Evaluation Policy, ensure Summary Response Documents are provided following EvaSys Course Evaluations. These should be shared at SSLC and posted on Moodle. If there are any reasons why changes cannot be made, this should also be clearly communicated. The Panel further recommends undertaking course evaluation during class time. Both practices should improve participation rates [5.1 and 5.2]	responsiveness to feedback ensures an effective student voice and improves the student perception that they are being listened to and therefore improves student satisfaction as well as improve participation rates	
11.	Consideration should be given to reviewing the structure of SSLCs. Currently, they are large and splitting between Honours and Non-Honours would enable more focused meetings and targeted action [5.1]	More effective student voice and enhance responsiveness, improving student satisfaction	Head of School