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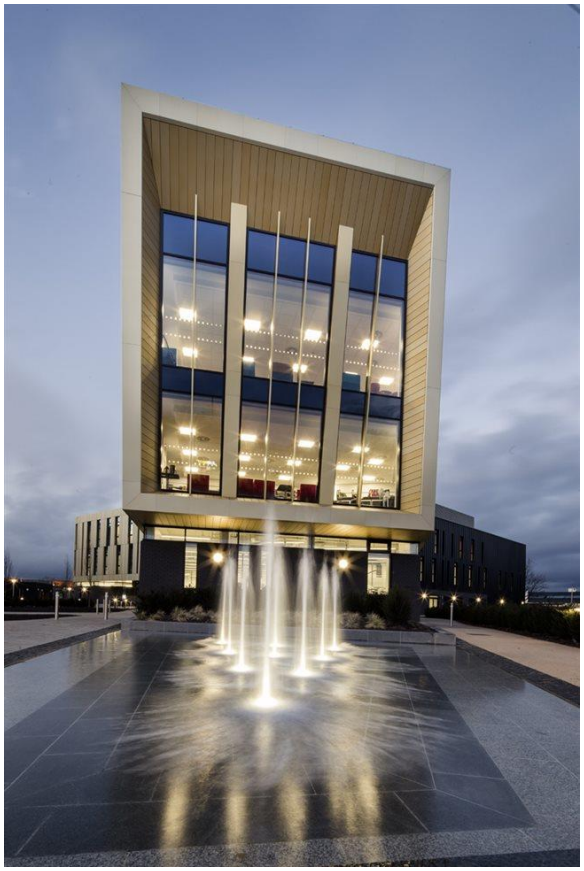
Post-Occupation Evaluation Report: Advanced Manufacturing Building October 2019



BUILDING UNDERSTANDING

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INTRODUCTION

In January 2017, Building Understanding submitted a proposal, to the University of Nottingham Estates Department, to conduct post-occupation evaluations. The proposal was accepted.

The Advanced Manufacturing Building is the tenth project to be evaluated by Building Understanding.

This report, based on detailed stakeholder feedback, aims to detail the strengths and the weaknesses of the Advanced Manufacturing Building, put forward recommendations and highlight best practice and excellence that can be applied to future projects at the University of Nottingham.

OBJECTIVES AND METHODOLOGY

OBJECTIVES OF THIS POST-OCCUPATION EVALUATION

- To bring to light any key issues associated with the building procurement process and management of the project
- To draw out stakeholder feedback concerning the design of the building and the experience of its end users
- To facilitate a half-day workshop, to discuss and debate the key issues revealed through the primary research
- To analyse all output from the face-to-face depth interviews, telephone interviews and the workshop to provide a summary report with recommendations

SCOPE OF THE STUDY

Building Understanding sought feedback on the following aspects of the Advanced Manufacturing Building project:

- Overall user satisfaction
- Design issues
- Construction issues
- Communication and collaboration amongst stakeholders
- Performance of the main contractor, supply chain partners and consultant teams
- Performance against programme and budget
- Satisfaction with the exterior of the building
- Satisfaction with capacity, the flexibility and functionality of space, and specific room types
- Satisfaction with the internal environment including temperature, lighting and noise levels
- Performance of operational technology, including data connectivity, AV equipment and teaching equipment
- Operations and facilities issues, including maintenance and cleanliness
- Security
- Accessibility

STUDY PARTICIPANTS AND METHODOLOGIES

Building Understanding conducted depth face-to-face interviews and telephone interviews. Six tailor-made questionnaires were prepared in order to canvas feedback from respondents drawn from the following categories:

- Internal client
- Consultant team
- Contractors and suppliers
- End-users of the facility
- Estates office staff

Face-to-face depth interviews

The study included depth face-to-face interviews of approximately one hour's duration with the following stakeholder roles:

- Head of Capital Projects
- Building Technical Manager
- External Project Manager
- Contractor Project Manager
- Associate Professor & Head of Department, Faculty of Engineering

Telephone interviews

In addition, telephone interviews were conducted with respondents in the following roles:

End users and key stakeholders

- Head of Faculty Infrastructure & Technical Services, Faculty of Engineering

Estates Office staff

- Senior Engineer
- Energy Manager

Consultant team

- Architect
- Quantity Surveyor
- Mechanical & Electrical (M&E) Engineer (two respondents)

The workshop

On 15th October 2019, a workshop took place involving 8 attendees from the various stakeholder organisations. The workshop objectives were to:

- Discuss and debate the findings of the primary research
- Generate recommendations to be applied to future projects commissioned by the University of Nottingham
- Highlight nuggets of best practice and excellence revealed in the project that can be adopted and applied elsewhere

The workshop commenced with a presentation, by Building Understanding, of the findings of the primary research. Attendees were divided into breakout groups, with each group charged with assigning recommendations to specific points of feedback.

SAMPLE SIZES

It is important to emphasise that the quantitative statistics in this report are based on very small samples. A total of 12 respondents were interviewed, either face to face or over the telephone, and their feedback forms the main body of this report. In addition, five foundation engineering students provided feedback via a focus group session and two post-graduate researchers were interviewed by telephone. Their feedback is referred to later on in the report.

PROJECT DATA

Name of facility:	**Advanced Manufacturing Building**
Location:	Jubilee Campus, University of Nottingham
Gross area:	9500m2
Number of storeys:	3
Users of the facility:	Faculty of Engineering
Room types:	Laboratories, workshops, offices, teaching, communal
Start on site:	July 2016
Date completed:	October 2017
Period on site:	65 weeks
Net project cost:	£17m net
Funding:	University of Nottingham, D2N2, Wolfson
Contract type:	JCT D&B with all relevant appendixes

PROJECT BACKGROUND

PROPOSED NATURE & FUNCTION OF THE ADVANCED MANUFACTURING BUILDING

Advanced manufacturing is a high priority research investment area for the UK, and manufacturing research at Nottingham has traditionally been very strong. The University of Nottingham is recognised as an international leader in a number of core research areas. The University identified that there were significant future opportunities that could lead to substantial further growth of its research portfolio.

However, future growth and engagement opportunities at the University were constrained by a lack of quality space and infrastructure, which placed the team at a significant disadvantage when compared with main competitors in Cambridge, Sheffield, Cardiff, Bath, Warwick and Loughborough.

In conceiving and constructing the Advanced Manufacturing Building, the University of Nottingham's strategic aim was to develop a state-of-the-art multi-purpose facility that would attract and enthuse the next generation of world class manufacturing engineers and enable leading international research and knowledge exchange.

The new building proposed the co-location of teaching, research and knowledge exchange activities, providing a unique environment with regard to:

- Furthering manufacturing science.
- Transference of basic research through to technology development.
- Adoption of technology and implementation by industry.
- Attracting first class students and researchers, with an emphasis on the home market.
- Enhancing the student experience through the development of a modern environment enabling the co-creation of science within an industrial context.
- Attracting the industry partners that support this work, enabling international research and knowledge exchange. This would underpin the development of enhanced teaching and learning programmes.

With long term partnerships with leading global manufacturers such as, Airbus, BAE Systems, Bosch, Cummins, GE, GKN, IBM, HP, Rolls Royce, Siemens, Unilever and Zeiss, the proposed Advanced Manufacturing Building would significantly enhance the University of Nottingham's capability to deliver large scale integrated projects and become a global provider of industrial research solutions.

Proposed common spaces would facilitate close interaction between academic and support staff, students, researchers and industrialists. The vision was for a dedicated manufacturing environment that would greatly enhance the University of Nottingham's ability to attract the best candidates for undergraduate and postgraduate courses and take advantage of a projected growing home and international market.

THE BIG PICTURE

Feedback from stakeholders delivers a clear consensus that the Advanced Manufacturing Building is a successful gateway building for the University of Nottingham, showcasing an impressive façade to the student population and local community. It has created an excitement amongst end users, some of whom were originally sceptical about their proposed move.

The early and continued involvement of members of the research team end user group has paid dividends, both in terms of satisfaction with the final outcome, and in terms of saving money through fewer post-occupancy changes. There is a clear sense that bespoke self-designed working areas meet the needs of those users who were involved in the design process.

Successful collaborative working was a theme across virtually all feedback. Individuals and teams worked well together and looked for solutions. Experience of having worked together on other projects created a helpful familiarity, with contractors buying even more deeply into the idea of wanting to please a known and valued client.

The late introduction of the foundation engineering students into the design process created issues for some end users. The needs of this cohort were not necessarily reflected in the final building, due to their late arrival into the process, and concerns were raised around the quality and usability of some the internal spaces and the teaching equipment provided.

There is dissatisfaction amongst end users with some aspects of the maintenance of the building post-occupation which has marred overall satisfaction levels slightly.

THE SUCCESSES

‘I think it would be fair to say that we had a clear steer from Estates from the beginning and they didn’t really veer from that.’

Leadership from the Head of Capital Projects and his team was valued for providing a clear and steady vision of what was required by the teams to make the project successful. Consequently, the building meets the vision and expectations set out by the University.

The Head of Capital Projects has built a team of contractors who have worked across several projects for the University of Nottingham. There were clear benefits to this on the Advanced Manufacturing Building: the main contractor was familiar with the University and knew what to expect; there was a desire to please an existing client, and relationships were already in place. The latter helped ensure the project ran smoothly and efficiently.

This project benefited from a committed and capable project manager from the main contractor, who was highly praised throughout, as were their supply chain partners, but the contractor’s project manager was singled out as an individual focussed on taking responsibility for solving problems.

‘We got what we asked for… and got the chance to feed in from day one. It was a different way of working with Estates… we hadn’t experienced that before.’

End user involvement in the design process has been a crucial element in satisfaction levels with the final product. Feedback noted that this was a new way of working, and alongside the excellent collaborative working, this meant that although there were lots of challenges, 'none of them were insurmountable.' Where end users weren't as involved, final satisfaction was noted as lower.

'Outside the brickwork and gold cladding are fantastic. The brickwork is very crisp clean and neat, and the curved area towards the entrance area is lovely. The gold cladding was crisply installed.'

The final product has won a RIBA Award, East Midlands. The exterior of the building received highly positive feedback with respondents citing a 'wow' factor. The cladding was praised, with the close collaborative working of the main contractor and architect contributing to the unique and successful outcome.

The building provides a flexible space, with students right in the heart of a research facility. This matches the University's original vision for 'heart space' that would allow users to see into different spaces within the building.

Most stakeholders believe that it is a high-quality building with few defects. It was delivered on time and within budget. A small value engineering exercise did not affect the overall vision for the project.

'We got the heart space which was key to the concept. We have offices, meeting rooms, post-graduate areas, labs and workshops all overlooking and through the heart space to each other. If you're a 17 or 18-year-old foundation student, you can see the workings of the labs and see leaders of the faculty in the seminar rooms.'

INNOVATIONS

Design

'…we were able to be part of the project and feed in actual information. When that information changed, or the requirements changed, we were able to impact the project straight away. It wasn't 'wait to the end and start ripping out the walls'. We were able to influence it all the way through the process.'

The Advanced Manufacturing Building is a 'quality building but quite traditional' in terms of construction.

What did stand out as innovative, in terms of the design process, was the early and persistent involvement of end users. Not only does this have a huge emotional benefit in terms of connecting stakeholders to the building, there is ultimately a cost saving as there is a reduction in costly post-occupation changes.

The project was designed to bring together a disparate group of end users into one building with specialist spaces and laboratories that met individual need. This was a departure for the engineering department in terms of working practice, and whilst there was 'buy-in' from many stakeholders, there was also some resistance to this goal amongst some potential end users. The success of the building can also be measured in the extent to which end users reversed their position:

'We had some staff that were dead against moving over, one in particular; however, after working in there, he apologised and said it's the best move he'd made. It does

foster a good working relationship for the PhD students and researchers and academics.'

Operational

The flexible design of the building has also ensured that, post-occupation, it can meet the changing needs of the research team, as and when new projects come in. Functional spaces and services allow for the re-deployment of space to match research projects.

The natural ventilation in the large area at the back of the building is 'semi-innovative' in the way that it interlinks with the mechanical system.

THE CHALLENGES AND LESSONS LEARNED

Where end users weren't involved in the design process effectively, the resulting work areas didn't meet their needs so completely. This was true not only of research team members who did not participate in the design process, but also of teaching staff who were introduced to the project part way through. There was criticism from some end users that the resulting teaching spaces were often not ideal for their needs.

'Yes, it does what we need it to do because we have adjusted the way that we teach in line with the accommodation that's available. If it was done the other way around, and we were asked what we would like, in order to teach the way we like, it would be completely different. It does work but we have had to make it work.'

Changes in design midway through the project caused some headaches. There was the loss of some flexible office space and issues around access strategies, which were impacted by the inclusion of the foundation engineering students. Earlier consideration of the impact of these new users would have helped mitigate post-occupation issues.

Involving non-technical stakeholders so intimately in the design process brought its own challenges, with some respondents discussing the difficulty of finding the right language to communicate effectively. Once engaged with a myriad of stakeholders, negotiating a route through conflicting demands could also be testing, especially bearing in mind the need to meet the budget.

One of the most heartfelt criticisms of the Advanced Manufacturing Building related to the cleanliness of the building immediately after it was handed over.

'Estates had no resource or plan for how they were going to set up cleaners. It took 12 months before we had concluded negotiations on that.'

Building maintenance staff weren't involved early enough prior to handover, and alongside a lack of cleaning provision, this meant that the building sometimes felt 'dirty' to users. Some departments paid for their own cleaning staff. There is a belief that there was a lack of leadership at point of handover and into early ownership of the building; end users were left to 'muddle through'. Greater training of users around sensitive building controls would have been a bonus.

Not all feedback around the handover of the building was satisfactory. Opinion was divided over the quality or otherwise of the soft landing. Whilst the main contractor was generally highly rated, the performance of their quantity surveyor, the slow provisions of costs and aspects of the soft landing all came in for comment.

Gender neutral toilets have not been well received by some female staff members, necessitating the reallocation of some toilets as ‘women only’.

Noise was highlighted by end users as problematic for a variety of reasons; poor insulation of the roof meant noise from birds was transmitted into the building. Some of the acoustics were regarded as poor, with noise pollution across lecture spaces causing issues for teaching staff.

QUANTITATIVE FEEDBACK

Overview

Quantitative satisfaction ratings were collected during the face-to-face and telephone interviews. Respondents were asked to rate their satisfaction with various aspects of the project on a scale of ‘zero’ to ‘ten’, where ‘one’ is very poor and ‘ten’ represents excellent. Bar charts displaying the scores (as a percentage) are shown within the text, where relevant.

These results show, at a glance, the range of levels of satisfaction with both the construction process and the Advanced Manufacturing Building itself. These have been included where relevant, throughout both the section on the design and construction phase, and the post-occupancy phase.

The areas showing the highest levels of satisfaction are the overall outcome of the building, relationships, including communication and collaboration amongst key players, the work of the main contractor and supply chain partners, the functionality and accessibility of the building and data connectivity.

Lower levels of satisfaction were reported for the cleanliness of the building post-occupation, the toilet facilities and for some aspects of the environment, particularly noise levels and audio-visual equipment. Similarly, security, the café and kitchen areas, and staff training at handover all received lower scores from some respondents.

It is very important to emphasise that these quantitative results are drawn from very small samples and are therefore not statistically significant. In such a small sample, one very positive or negative respondent can sway overall responses significantly.

Some respondents were only involved with specific aspects of the work and so their responses are limited to only that area.

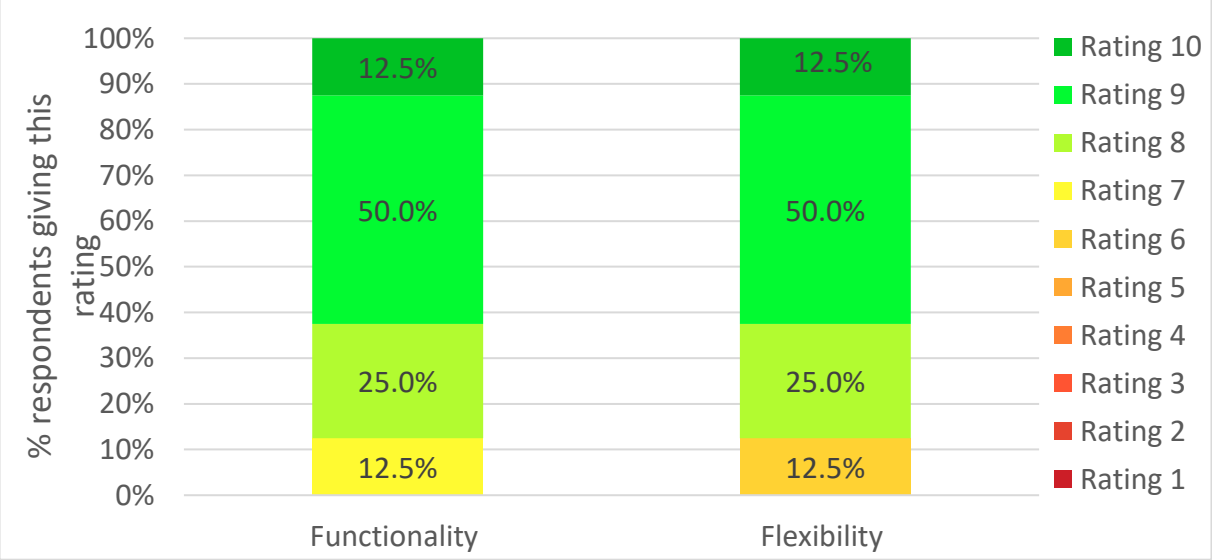
THE DESIGN AND THE CONSTRUCTION PHASE - QUALITATIVE FEEDBACK

The design and construction phase of the project was relatively smooth, with a building that met the University's original vision delivered on budget and with only a small programme overrun which the University was able to manage effectively.

The most significant issue was the late addition of the foundation engineering students during the course of the project. This created challenges in terms of space usage and in management of expectations of 'existing' end users and the 'new joiners'.

FEEDBACK RELATED TO THE DESIGN AND LAYOUT

Functionality and flexibility



'There are so many different types of spaces and how they all work with each other is particularly pleasing.'

Creating a flexible workspace was key to the success of this project. A key design driver was that space should not be 'fixed', so that it could be used flexibly post-occupation. Many respondents feel that this vision has been successfully implemented, with workshop spaces that can easily be 'reconfigured', and the opportunity to run power in or out though floor ducting or overhead as required.

'It's a flexible building for the timeline of a normal research project.'

The detailed involvement of end users during the design process ensured that, for example, machines were positioned correctly from the outset. This had the ultimate outcome of saving the University money through reduced post-occupancy changes. To be involved in this way was highly unusual in respondents' opinions, and greatly valued.

Part of the building's remit was to facilitate greater collaborative working. There was mixed feedback as to whether this objective has been achieved, although it should be noted that these interviews have been completed relatively early in the occupancy of the building, and

this may well change. However, there was a view that change of working practice needs to be supported by policies from the University that address ‘siloed working’. At the workshop, respondents fed back that they felt staff preferred the end building as the space is more ‘interactive’.

The social areas of the building are not wholly successful in helping people to mingle; they only accommodate small groups of people and a larger social area is needed for ‘getting to know you’ interactions. On the other hand, the ‘beautiful’ staffroom was criticised for not being suitable for holding sensitive conversations. However, other respondents felt that a staff room was not the correct place to hold sensitive conversations, so this was not perhaps a valid criticism.

Room types

There is a good split between academic offices, teaching space and workshop areas, although the office areas were considered ‘a bit static’. The design of the building allows for good flow around the facility and the atrium successfully provides the conceptual ‘heart space’ that had been planned.

There were opposing views as to whether the late insertion of the foundation engineering students into the building has been wholly successful. At this point the building was converted from a research building supporting three large research groups, to a research and teaching building.

Some respondents believe that the incorporation of the foundation engineering students has been done well and is testament to a positive change in management processes. Another described it as having to redesign ‘an existing building’ to meet the needs of new users, but was pragmatic about the change, ‘…these things happen’ and considered the overall outcome to be a success.

However, one respondent was very negative about the space in terms of usage by the foundation engineering students. Criticisms included poor regard for the functionality and flexibility of the space, a dislike of the design of the internal space, a lack of individual study spaces and a belief that students don’t like being taught in a research facility. This perhaps could be partially attributed to the late incorporation of the views of this cohort into the design process.

Although the team coped from a design perspective, some things would have been done differently had the team known about the foundation engineering students from the outset: columns in some spaces would have been omitted had the architect known that they would be teaching spaces.

In terms of changing space usage, for example, a room that had originally been set up as office space for one of the research groups was converted to a staffroom, and open plan office space was changed into seminar and teaching space. Staircase widths had to be revisited, as did fire strategies.

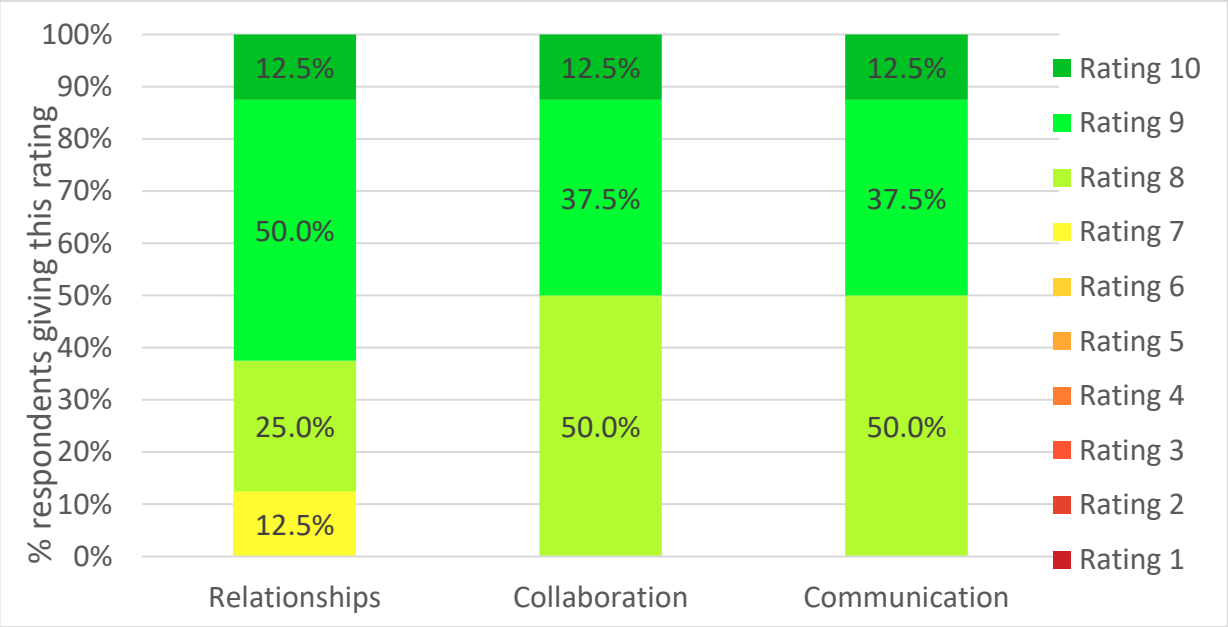
‘I think because the decision was taken late, that our involvement was less… I do feel that it wasn’t intended to be a teaching space.’

In general, however, respondents felt there is a good balance of room types that meet needs. Omissions that may need future consideration include a maternity room for breastfeeding mothers, a first aid room and a prayer room.

Recommendation

- Where changes in the planned use for a facility occur midway through a project, ensure that sufficient time is given to considering impact on all aspects of design, and for stakeholders to take on board changes and think through relevant strategies for coping.

FEEDBACK RELATING TO RELATIONSHIPS, COMMUNICATION AND COLLABORATION



'…we all recognised what each other wanted out of the project and worked together to achieve that common goal and work within budget, pushing it as far as we possibly could.'

Familiarity with key players helped this project along. The Estates team knew the architect, the mechanical and electrical designer, and the main contractor, well.

Leadership from the Estates team was an important element in the success of this project. This impacted in a number of ways: a set of relationships with known contractors was already in place, clear and effective lines of communication were established and a steadfast vision of what was required was maintained. The latter manifested itself in minimal changes to the design once the project was underway.

The Head of Capital Projects had regular informal meetings and site visits that helped to build trust and a willingness to work together effectively amongst the contracting teams. This close working relationship allowed the contractor to see how the Estates team was trying to balance the needs and desires of end users against the budget available, for things such as internal furnishings.

Stakeholders commented that the experience of being able to work together with the mechanical and electrical designers, and other subcontractors, was a useful exercise.

'We had the opportunity to talk about proposals and some of those ideas were taken away...'

Maintaining this relationship via ‘building walkthroughs’ late on in the construction phase meant stakeholders had an opportunity to review the work prior to handover.

This early and consistent engagement meant that considerable expenditure was saved further down the line. For example, it stopped the electrical trunking being wrongly positioned. A walkaround meant that end users were able to highlight this at fitting stage, saving a major and costly realignment post-occupation.

‘If we hadn’t been on site as much as we were, we would have missed that, and it would have gone from being half a day’s work to a major feat and cost a lot.’

Collaboration enabled tricky problems to be solved effectively. For example, collaborative working between the consultants, the contractor and the end users meant that they were able to get the natural ventilation and mechanical extraction from the specialist spaces in the large warehouse at the back of the building, to work. Likewise, good communication between Estates and the main contractor meant that they were able to work together to accommodate a significant change of brief: the inclusion of the foundation engineering students.

‘The very close core team working on the project meant we were able to react.’

Key individuals communicated effectively throughout the project and the main contractor’s project manager ‘did an excellent job of communicating’. Consultants appreciated the fact that clear lines of communication meant that they knew who to talk to if issues arose. Direct and open contact via face-to-face meetings and phone calls was valued, as opposed to an over reliance on emails. There was a noted absence of bottlenecks amongst the staff team within estates. Conversely, a single point of contact from Estates into engineering worked well and stopped information overload.

When a rare disagreement arose, such as over costs in pre-construction, there was no ‘falling out’. It was noted that when the consultant involved understood that the error lay on their side, they initiated a ‘lessons learned’ process.

Collaboration within the wider team

‘Everyone valued everyone’s involvement. We had hard discussions and debates and you could be rational and come up with a solution.’

Contractors and consultants knew each other from previous projects. This was hugely helpful. An unusual absence of ‘tension or battles’ was noted amongst the different stakeholders.

Having established a relationship with the technicians, the contractor felt they got to know them well during the process. The extended team worked together ‘brilliantly’. They were invited to regular meetings and their input was valued and taken onboard. This contributed to the sense that the contractor wanted to do well for a known and valued customer.

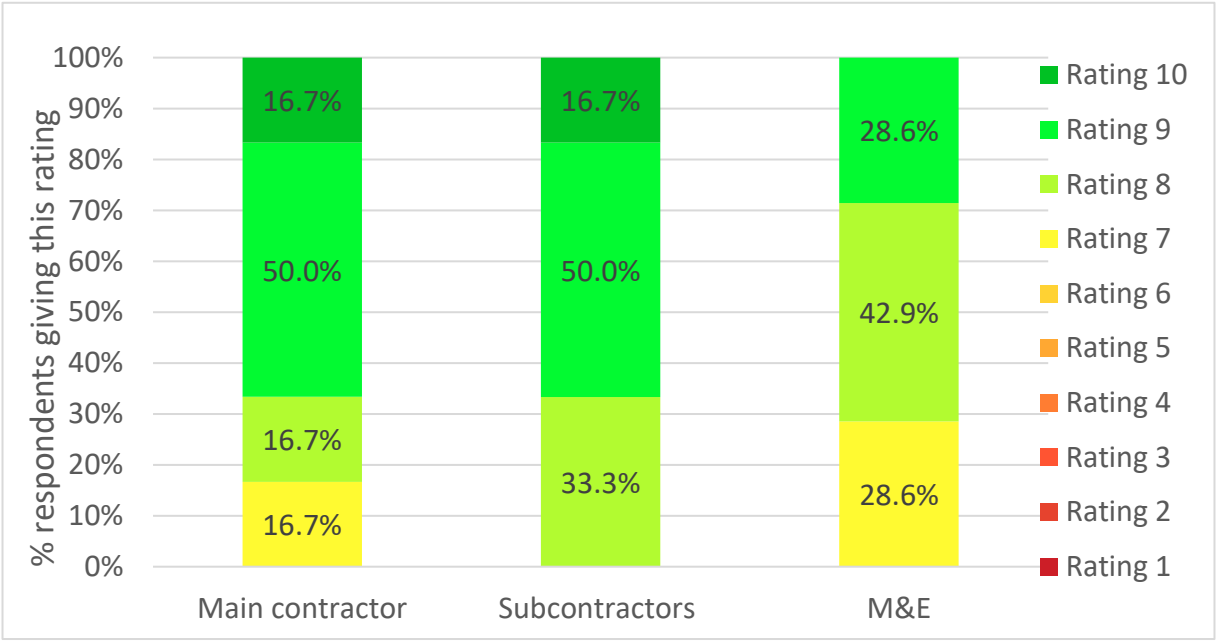
Communication between the extended team members

The foundation engineering students and their teaching staff were not originally anticipated as end users of the Advanced Manufacturing Building. Their entry into the project in the latter stages of the design process meant that early opportunities to reflect their needs in the building design were missed.

These end users did feel included by university staff once their involvement in the project began, and the contractors were happy to host site visits, but there is a sense that

management of this end user was not as smooth as it could have been. Greater attempts to pull this end user into the design process as much as possible once they were on board might have raised satisfaction levels later down the track.

FEEDBACK RELATING TO MAIN CONTRACTOR, SUPPLY CHAIN AND CONSULTANT TEAM



Main Contractor

‘Good, solid, excellent as ever. Not contractual. Good at design management, programme and managing change with us’

There was a great deal of positive feedback related to the performance of the main contractor on the project as ‘one of the best I have ever worked with’. Another stakeholder commented that the main contractor brought ‘a lot experience and expertise’. They placed a good team on the project comprised of ‘strong’ individuals. The main contractor added value through their suggestion of a ventilation strategy for the main workshop. This was done in conjunction with their subcontractors.

The main contractor’s project manager can take much of the credit for the positive relationships built up between the contractor and the other stakeholders. He was always readily available. The project manager was responsible for the arrangement of space that enabled the accommodation of the newly arriving foundation engineering students; he also enabled the delivery of the café and the clean room.

Stakeholders noted a sense of genuine commitment from the main contractor to making sure issues were resolved to the satisfaction of the end users. This can perhaps be attributed to the involvement of those end users from day one.

The major issue noted with the main contractor concerned the slow provision of costs. This was particularly noted with reference to the changes brought about the later entry of the foundation engineering students.

‘I expected a price within a fortnight not six months. With a change, you should be able to tell me whether it’s between £5k and £6k, or £25k and £28K.’

There was a proactive attitude to both flagging problems and then rectifying them, often led by the main contractor’s project manager; for example, finding a solution to the site contamination issue.

Consultant Team

The fire consultant came in for some criticism. There was an increase in the number of people who would be using the building when the University added in the foundation engineering students. It was felt that the fire consultant was not as helpful as they could have been in response to this.

The M&E engineer’s overall brief was considered to be lacking in detail, but it was felt that the team of M&E engineers could have done more to help. There was early project tension around meeting all of the mechanical and electrical requirements; this could have been improved with more effective management of M&E though the tendering stages. That said, the M&E engineer’s designs were considered to be good, and their key personnel worked well.

Recommendations

- When there are late changes, make sure the process for picking them up is strong and includes sufficient time for the consultant team to be fully informed and involved.

Supply chain

The main contractor was considered to have a good set of supply chain partners who engaged well. The main contractor employed known local subcontractors where possible and this helped. Most of the subcontractors on the project were praised. Specialist contractors were brought in where necessary to meet client need.

The building services subcontractor was rated positively in the feedback, with respondents highlighting that they accepted responsibility for, and sorted out, defects.

There were occasional examples of poor workmanship from subcontractors; examples of things that hadn’t been finished properly: ‘There were little bits of leaking in the kitchen. It’s that sort of thing, all pretty small.’ However, post-handover, some subcontractors were readily available to help out with issues.

The architectural aluminium installers had a good design and product but were let down by poor installation.

FEEDBACK RELATING TO VALUE ENGINEERING

There was a small value engineering exercise that didn’t compromise the brief but reduced the building down in size slightly. ‘We started out with a much larger scheme at the very start of the competition stage and slowly the square meterage got brought down.’ This was linked to available budget and the need to stretch it as far as possible.

‘We managed to retain that original intent from the very start…The scheme that we came up with could adapt to what it needed to be without wholeheartedly changing what we had presented. The sense of the building remained the same.’

FEEDBACK RELATED TO THE PROGRAMME AND DELIVERY AGAINST BUDGET

The building was delivered broadly on time, with a month overrun not causing too many issues as the University was able to occupy some parts of the building early.

Meeting programme was a key consideration as end users had to book movers months in advance in order to ensure that complex equipment could be moved into the building as required.

'Our first delivery was able to access site on the day it was meant to and at the right time…'

It was noted that some respondents felt the programme became 'quite tight' towards the end, which led to some anxiety. The main contractor noted that getting the reception area finished was left to the last, and ideally, toilets could have been finished more speedily. The external works also took longer than anticipated.

However, the appearance of a late finish to some elements of the programme was actually felt to be perception issue, with the commissioning phase of the project occurring exactly as planned, but perhaps giving some end users a sense that the building wasn't completed on time.

Similarly, late delivery of toilet white goods was not caused by issues with programme, but rather by a change of supplier at a university-wide level; this was unforeseen and impacted the Advanced Manufacturing Building (AMB) at move-in phase. It was not actually a scheduling issue but again may have increased end users' sense that the building was not completed on time. This is unlikely to occur again the future.

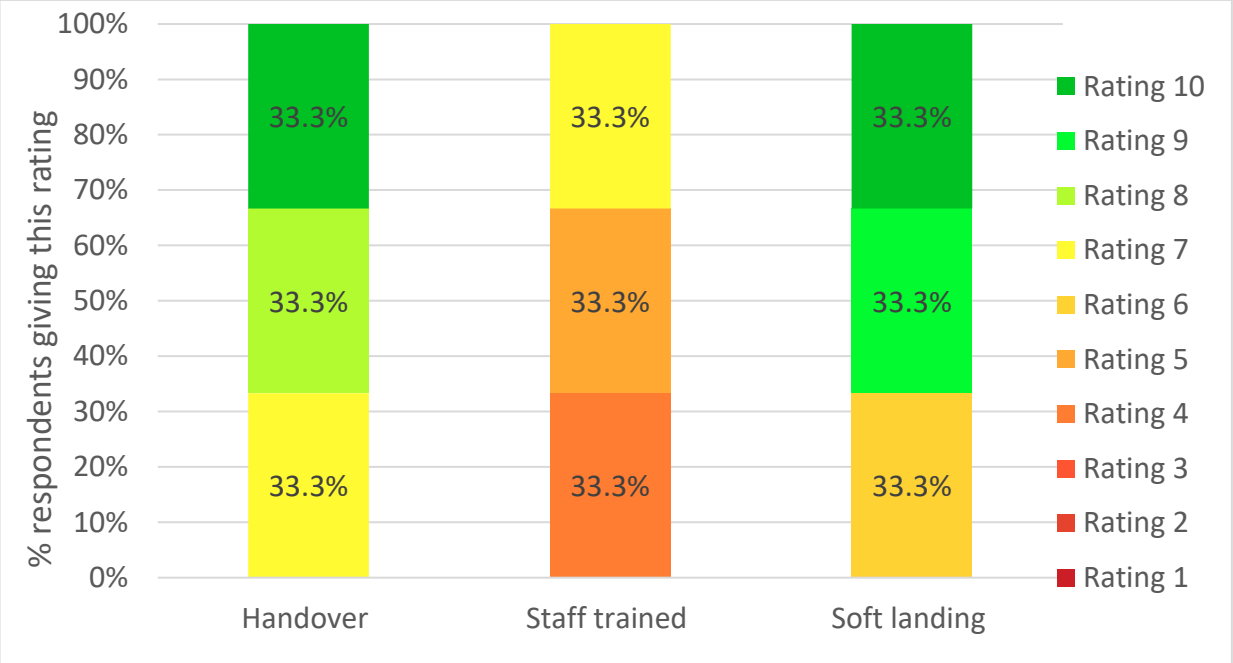
Some consultants noted that they were asked to visit site to 'witness things' without having seen the certificates beforehand. They would typically expect to see certification prior to a visit.

'If anything, it was the other way around: it actually came back cheaper than we thought it would be.'

There was pride amongst stakeholders that not only had the project been 'delivered on budget', but in fact was slightly less expensive than anticipated. This was attributed to local supply chain services and labour being cheaper than those used for benchmarking. Better research of the local market for benchmarking purposes was suggested for future projects.

One respondent expressed surprise that the competitive tenders were 'positively low' and this meant that there wasn't any 'scrimping' on the part of the University.

FEEDBACK RELATING TO HANDOVER



There was mixed feedback on the handover of the Advanced Manufacturing Building.

The biggest gripe concerned the soft landing. The soft landing, whilst not markedly poorer than others that had occurred elsewhere at the University, was not what the client had anticipated. One stakeholder believed that whilst a soft landing had been commissioned in the contract, this didn't happen and something 'more pragmatic' occurred. The University believed that during the procurement phase, they had been promised a soft landing in line with Government Soft Landing (GSL) standards by the main contractor; this had been paid for but had not been delivered. This money was ultimately refunded by the main contractor.

The main contractor disagreed, believing that their early involvement in the design management process, focussing in on individual faculty specifications, and their involvement with end users at handover, was important in ensuring end users were set up to succeed. The main contractor believed this offered value for money. It was clear however, that this did not match the client's expectation in terms of meeting GSL standards.

In fairness, one of the end users commented, 'That [soft landing] worked really well. That would be a 'ten' because we ended up getting to the date in January when we had moved to two intakes a year with the foundation year.'

Completed material should have been available to review earlier, as should some of the relevant manuals; insufficient staff training occurred, with staff left to 'get on with it'.

The University of Nottingham is restructuring the Estates team and the new teams will be outlining a policy-based approach that will ensure a clearer outline for, and greater focus on, handover and the soft-landing of new buildings.

Recommendations

- Ensure there is a clear definition of 'soft landing' agreed between all stakeholders before the project commences.

- Hold a meeting either during procurement, or early in the construction phase, to discuss the soft-landing phase and begin preparations early.
- Review preparations before soft landing begins; tweak the ongoing process as required.

O&M Manuals

The main contractor provided sufficient information to the building manager, including the O&M manuals.

The building manager, who was noted by end users as proactive in getting things done, was able to use his experience of running buildings elsewhere to manage the Advanced Manufacturing Building. This helped in the light of little perceived direction from the Estates department as to how they wanted or expected the building to be run.

Commissioning

Problems towards the end of the commissioning period meant that some re-visits were necessary. During the last three or four weeks there were some problems that caused the mechanical and electrical consultant to revisit site. This meant that the process took longer than would have been expected, although it was noted that this was not unusual.

Resolution of Defects

There were few defects at completion, as a management process during construction had been underway and defects had been sorted out as the build proceeded. This meant that at point of handover itself, ‘We didn’t have a big list. I was going through it. The main contractor had a good defect resolution process and got on 90% really quickly.’ Again, the proactive nature of the main contractor’s project manager was highlighted, with credit given for identifying and taking responsibility for sorting defects out.

‘They went the extra mile. They bought in to the fact that this was going to be a prestigious building.’

The quality of finish was assessed as high by most respondents. The Head of Capital Projects’ regular presence on site towards the end of the project contributed to ensuring that the building met the University’s expectations.

The main contractor was praised for both the small number of defects at handover and the proactive and responsive way in which they dealt with those that did arise. Where issues such as water splashing under hand dryers was raised as an issue, clear Perspex was installed, demonstrating an understanding of the high-quality finishes that were needed throughout the building.

There were ‘a couple of bits’ that had to be snagged afterwards but they were ‘really minor’ things. For example, there were issues with the lighting that had to be rectified: the suspended light fittings didn’t hang properly near a column, and some condensers and pipework leaked, but there was nothing significant. Where glass panels and doors didn’t meet properly, this was quickly rectified.

The snagging list was dealt with promptly which was good as it was done over the Christmas period. This prompt and effective way of dealing with snags meant that one respondent questioned whether the employment of a snagging consultant was necessary, as the main contractor was so reliable in sorting these issues out.

In the main, subcontractors were also found to be responsive during this period.

POST-OCCUPATION ISSUES - QUALITATIVE FEEDBACK

FEEDBACK ON THE MOVE-IN PHASE

The early days of occupation of the building could have been improved had there been more training for end users on the environmental controls in place on the building. If this wasn't possible, or indeed to support this, labels on heating controls, for example, asking end users to refrain from adjusting the controls, would have been helpful. Helping end users to understand how the controls had been set for 'optimisation of the environment' would have reduced end user tweaking of the controls.

End users expressed dissatisfaction with the lack of planning given by the Estates team to cleaning the building during early occupation. This, combined with a lack of introduction for staff to maintenance protocols, meant confusion and poor cleanliness during the early days. This took a while to resolve and caused discontent amongst end users during their arrival and early occupation of the building.

FEEDBACK ON THE EXTERIOR OF THE BUILDING

'However, when you look at the… external cladding, and the way the landscaping all ties into it, it is an outstanding building. It's one of the nicest buildings I have done.'

Feedback on the external quality of the building is universally positive; the building is regarded as 'impressive'. The quality of the brickwork and the cladding is immaculate with the brickwork contractor going the extra mile to deliver something special. The gold cladding looks 'fantastic' with the curved area towards the entrance area described as 'lovely'. The landscaping and water feature are excellent. Overall, the building presents a quality façade to the outside world and has made the campus visible to passers-by.

FEEDBACK ON THE QUALITY OF INTERIOR FINISHES AND FITTINGS

There is mixed feedback on the quality of the interior finishes and fittings. Workmanship was considered good throughout. The finishes are generally good, and, in the overall scheme of things, problems are in a minority. One stakeholder commented that users recognise that it is a 'smart facility' that they need to 'keep up'.

Some of the materials could have been of a higher quality but the budget dictated what was possible. The black interior paint work looked good initially but has been prone to chipping and has quickly started to look 'tatty'. Some respondents said that some parts of the interior are already showing wear and tear. The colour of carpets was criticised for showing the dirt.

Recommendations

- Instruction should be given to cleaning staff to make sure that walls are wiped down properly.
- A plan should be implemented to retouch the black paint where possible.

FEEDBACK RELATING TO BUILDING USAGE AND CAPACITY

Capacity

'The September intake we have to double-teach everything because we can't accommodate everyone.'

Capacity issues mainly relate to the late inclusion of the foundation engineering students to the building. This course was accommodated into the building as it had outgrown its previous space. The course is set to enrol 350 students. However, the Advanced Manufacturing Building can't accommodate these students as teaching staff would like either, with the year being split into teaching halves of 170 students.

There is also a lack of space to accommodate the foundation students properly at lunchtime and during breaks. They 'spill out' of prescribed areas and sit on the floor and make some noise. This doesn't sit well with some of the research staff who are looking for a quiet environment. Options discussed for offering alternative space included giving the students access to the staff room and the pod spaces around the building. Ultimately these were rejected as likely to cause too much disquiet amongst academic staff and researchers.

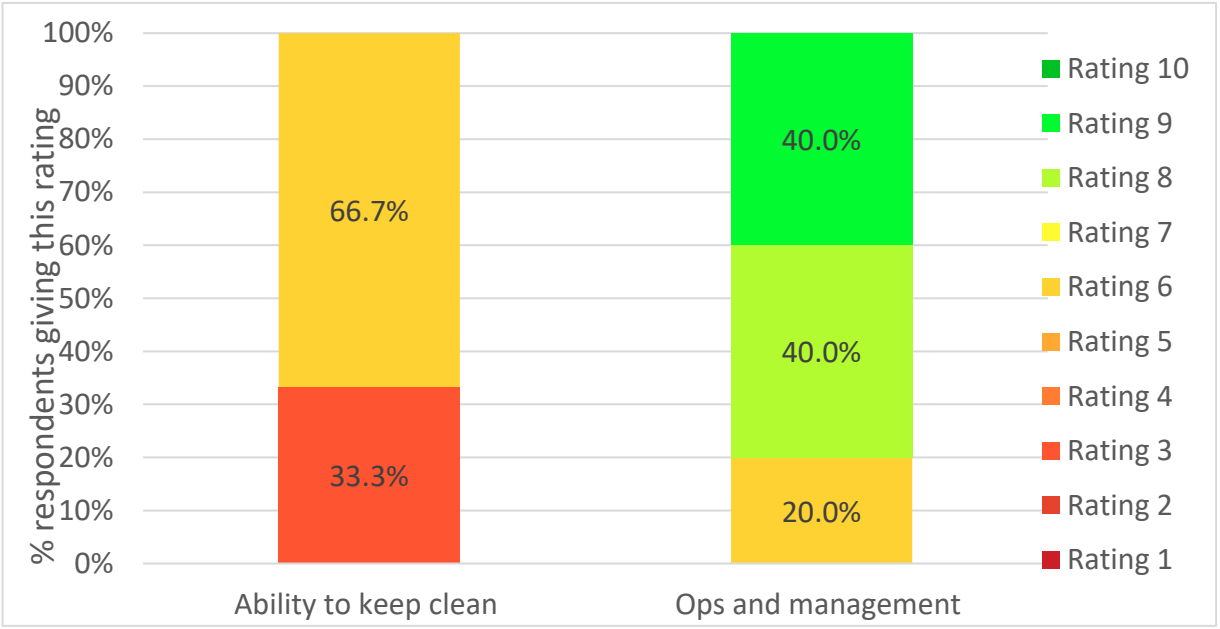
'We needed a 9000sq m bungalow but… we ended up with a three-storey building.'

Additionally, there was the problem of how to accommodate the research related equipment, that needed to be on the ground floor, into a three-storey building. Working through the different options and scenarios, the solution involved the creation of a structurally reinforced 'B' floor. A 9000 square metre bungalow was made possible by turning 'B' floor from a normal floor into a structural floor; there is a triple height area with composites on 'B' floor going right up to the ceiling.

Recommendations

- Increase the density of seating provision within the atrium so that there is more available space for the foundation engineering students to study either individually or in groups.

FEEDBACK RELATING TO CLEANLINESS AND MAINTENANCE



Cleanliness

'... you have a flagship building; everyone was really proud of it, but it's filthy.'

The cleanliness of the Advanced Manufacturing Building came in for a great deal of criticism from end users. The initial cleanliness of the building was described as 'abysmal'. Several causes were attributed to this, including a lack of budget, a lack of initiative and a lack of flexibility from the current service provider in the provision of labour. It has been impossible for any cleaning to take place in the afternoon due to existing staff rotas.

As a consequence, a series of ad hoc solutions have been implemented. The main contractor decided to put in a cleaner at the start, which was not part of their brief, but they did so because of the need to ensure that the building looked good for visiting dignitaries. One end user felt that this was taking advantage of the contractor.

Individual departments took the decision to employ their own cleaners to keep on top of things. One end user described vacuuming before the arrival of an important visitor. Cleanliness was felt to be an ongoing issue with a permanent solution still not having been found.

There was frustration that the Estates department did not provide an adequate cleaning budget for the new flagship building. The lack of budget was exacerbated by a perceived lack of planning for this aspect of the process.

Recommendations

- Create a plan for cleaning, with a protected budget, for at least a year after practical completion.
- Take steps to ensure that the plan is prepared and implemented from the very beginning of the building's occupation.

Maintenance

'… but from a maintenance point of view, it's a good asset for Jubilee and the University.'

The maintenance team was not regarded as having been well trained and there was a lag time in terms of the team picking up on some of the checks that they should have been doing. This was caused by some confusion over who was responsible for maintenance: one stakeholder believed that maintenance team thought the main contractor should be picking up problems and vice versa.

The general consensus was that there had a been a structured approach to training on the building and there had been plenty of training for those staff who wanted it. However, the difficulty of engaging with the maintenance team was highlighted by several stakeholders. Very often maintenance colleagues were reluctant or unable to attend the training that was offered. A training day that had been offered by the main contractor for AMB's maintenance team was attended by only one of a possible 20 people invited. This was considered to be an unacceptable situation.

Failure to attend training sessions had actually led to inadvertent damage to the building by 'ill-educated' maintenance staff. Two defects with the roof had been reported by the maintenance team; these were in fact not defects, but issues caused by the maintenance team cleaning the siphonic roof incorrectly and causing damage.

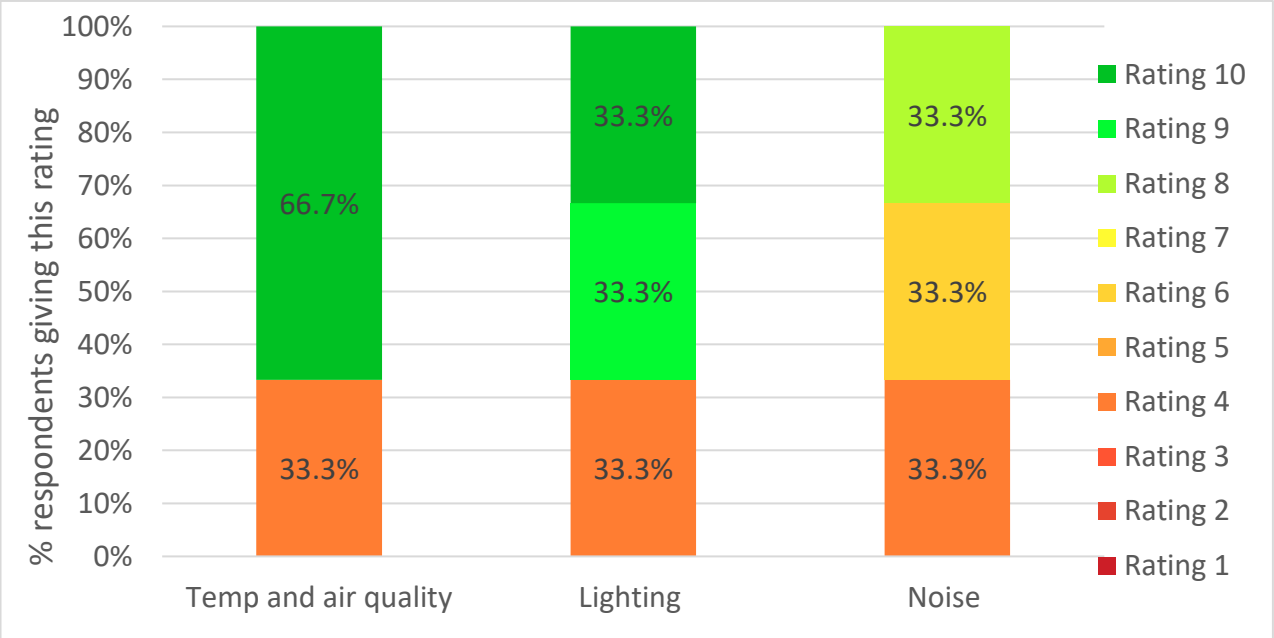
Consideration was given to whether the training could be improved. One stakeholder made the point that very often training covers systems that are fully automated anyway. Perhaps 'scenario based' training would be more attractive, and prevent recent confusion caused by a fire alarm going off that then triggered the closure of other building systems.

Overall, services are regarded as easily accessible from a maintenance point of view.

Recommendations

- Ensure that the maintenance team gets involved earlier in the project journey.
- Early and prolonged engagement with the maintenance team would reduce any issues caused by a lack of training on any project.
- Work with the maintenance team to identify training themes that would be most useful to them.

FEEDBACK RELATING TO THE QUALITY OF THE INTERNAL ENVIRONMENT



Lighting

There is a good lighting design throughout the building, with all lighting features that had been asked for present. This meets users' needs. The bespoke lighting that matches the diagonal wall in the atrium works well; the entrance lighting is a 'display piece' that has also been done effectively. The mechanical services team pushed to get the best equipment that they could and installed it in a high-quality way.

Some early problems with overly sensitive lighting sensors, that irritated staff who had to get up to turn lights back on, have been resolved. In general, lighting has caused few complaints from end users.

Noise levels

'When it rains you have to move out of the office to have a conversation.'

Noise has been more problematic. Birds hopping about on the roof and heavy rain could both be heard internally. It was noted that birds had attacked the insulation on the roof because of its shininess; in some cases, this was so bad that leaks were caused. This has now been rectified with installation of additional insulation.

Internally there has been poor feedback from some end users over the way noise travels and interrupts research staff. This is due to the foundation engineering students moving around the building. It's not considered that the students are being deliberately disruptive, just that the volume of students moving about the building during the course of their studies creates additional and unexpected noise.

The acoustics in the teaching rooms is considered poor by some. Panels that allow one large space to be divided into two do little to reduce noise pollution from one room to another, with the result that lecturers have to keep their voices down so as not to disturb teaching in the other room. However, it is likely that this is actually an issue of incorrect usage; if the doors

are closed properly, they will be fully sealed and there should be no noise pollution from side of the partition to the other.

It's not helpful that the close proximity of a disabled toilet to the lecture theatres means that toilets can be heard flushing from the lecture theatres.

One end user commented on the fact that radiators can 'whistle'. This causes a particular problem in the audio-visual room where any high or low frequency noise is picked up when users are recording material. This has led end users to noise proof the radiators themselves. One member of staff is particularly sensitive to this noise and has had to turn his radiator off.

Recommendation

- Training for users and new members of the maintenance team on how to close the partition door properly, and thus seal it acoustically, is required. This should rectify the issue of noise pollution from one lecture theatre to another.

Temperature

'They have done a very good job in terms of the design and functionality of the heating/cooling airflow.'

Some end users described the building temperature as 'erratic'. However, most feedback describes temperature as good, with the building comparing well to other University projects in terms of heating outcomes.

One interviewee described the air temperature control as one of the best features of the building, with temperature in the workshop spaces and atrium working effectively to meet need. The insulation of the building meant that when extremes of hot weather were experienced, staff and students were prevented from 'cooking'.

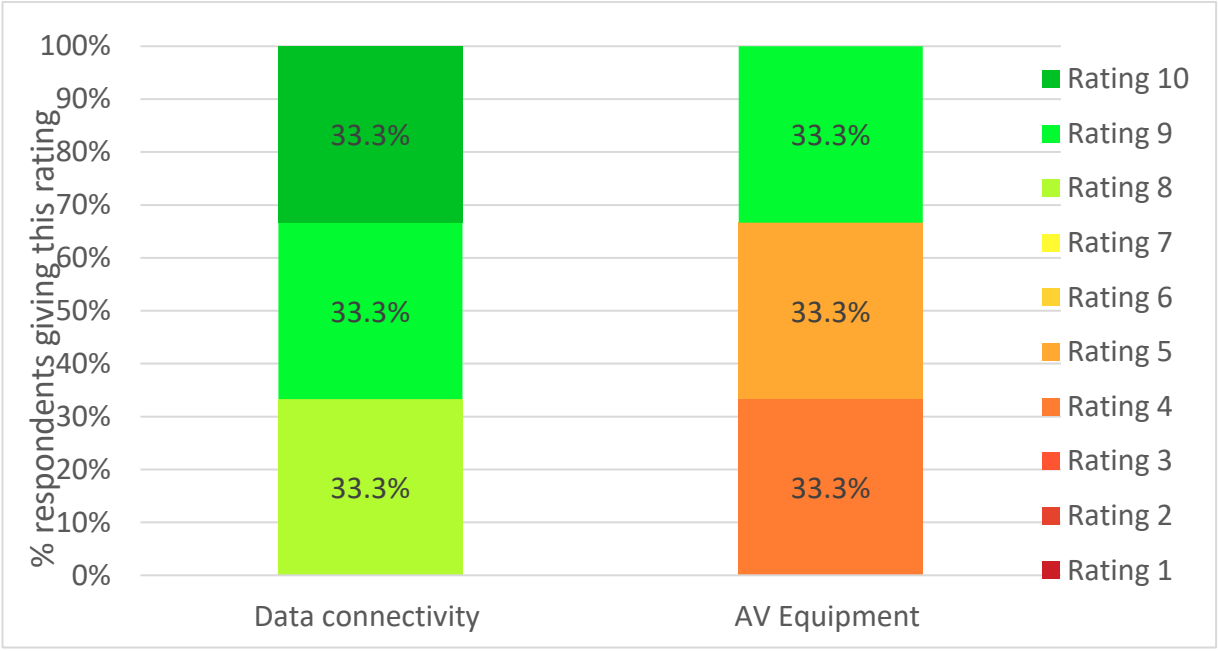
Resolution of issues

One of the biggest headaches for the building was the compressed air unit. The unit was installed on the roof in 'housing' which didn't have any ventilation. This meant that if the unit overheated it would switch off. This had to be retro fitted and took a while to resolve. A covered plant room on the roof would prevent degradation due to exposure to the sun.

There was also a problem with vibration in the metrology laboratory. The air handling unit was positioned on an isolated floor, but noise was being transmitted through the pipework. This issue fell within the warranty period and a solution was found that meant the unit was strung from the ceiling and no longer produced any vibration that could be felt.

The main contractor took responsibility for these issues, admitting that mistakes had been made. With regard to the problem in the metrology lab, it was possible that this could have been avoided with greater involvement from the metrology team during the process. Ultimately, though, these issues have been resolved to the satisfaction of the stakeholders concerned and the University.

FEEDBACK RELATING TO ISSUES WITH EQUIPMENT



Operational Technology

The Smart Boards were not considered to be of a high quality, with one respondent noting 'buckling' of the screens once in use. Despite training, day to day usage of the Smart Boards has been abandoned due to poor quality.

Acoustics and equipment

The acoustics of the teaching spaces came in for criticism as did some of the audio-visual equipment that was moved across. Foundation teaching staff feedback was that the equipment doesn't work on occasion. A technical solution to the latter has now been found.

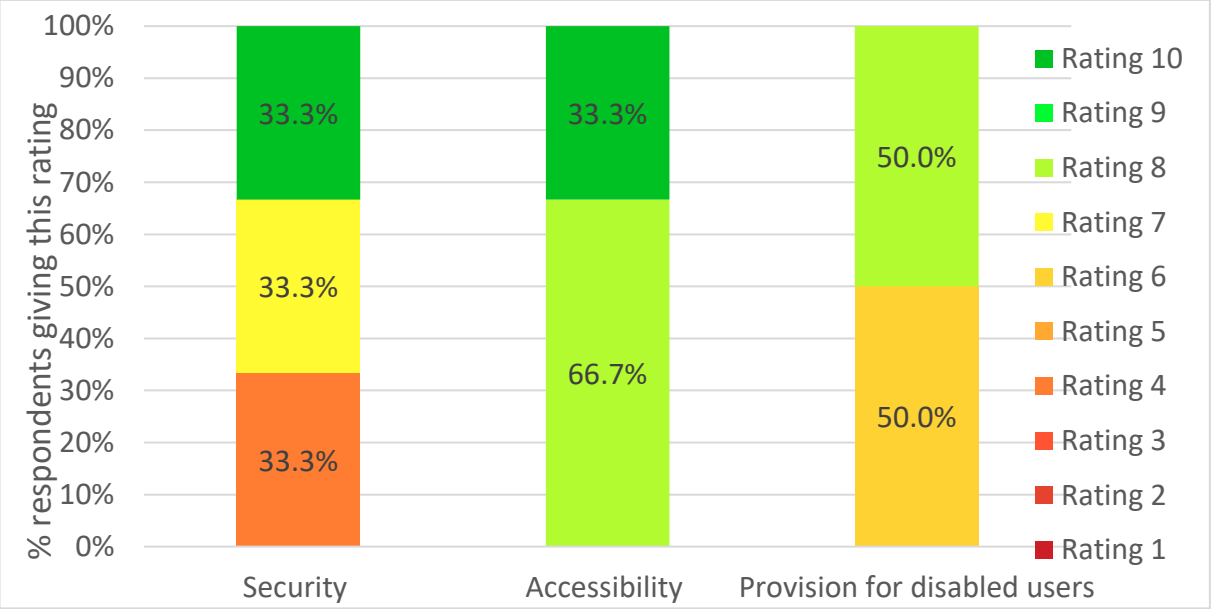
Data connectivity

All the feedback on data connectivity was positive.

Lifts

Although the lift was noted as being out of order at one point, there are no general issues with lifts reported.

FEEDBACK RELATING TO SECURITY AND ACCESS



Security

There was mixed feedback on how secure the building feels to end users. One end user commented that security is good, with both internal and external cameras, card access and fingerprint recognition, and 'doing what it needs to do'.

However, another commented that the building feels unsafe out of hours, with individuals in the building who have clearly not signed in. It was highlighted that not only was this a security risk, it would also be problematic in the event of a fire.

Another end user regarded the 24-hour access as making the building vulnerable and a security incident, 'more of a matter of when not if.' Although there is CCTV in place the quality is questionable, and it is not believed that it is much of a deterrent as it is not well placed.

Card access is described as 'easy' although one end user suggested that more card access points would improve security. There is a suggestion that it would be good to revisit the number of card access points, preferably with a view to installing more. The inclusion of the foundation engineering students meant that there was a demand for additional maglocks to keep the students away from certain areas. However, the Digilocks don't offer as much security as is desirable: 'if you know your way round the building, you can get around some of the systems.'

Side doors are being used as entry and exit points despite not being designed for such usage; they are primarily fire exits. The main issue is that it isn't guaranteed that they will always have sufficient weight to close again once having been opened. Frequent adjustment is required to keep them secure and they are considered to be a security risk.

Overall, it would perhaps have been desirable to sit down earlier and consider the access strategy as soon as it was known that the foundation engineering students would be studying within the building, and the implications that this would have on security.

On a separate note, the bike sheds were not felt to be very secure, with six bicycles having been stolen in 18 months, alongside a motorbike. It was questioned whether the positioning

of the bike sheds had taken into account the view of anyone who had cycled. The lack of security did not encourage cycling.

Recommendations

- Encourage end users to take responsibility for improved security by ensuring the building's side doors are always properly and completely closed. New signage could emphasise this point for building users.
- Feelings of isolation and trepidation amongst end users working in the building at night or at the weekend need to be raised with the faculty and dealt with under the faculty's 'Lone Working Policy'. Checks need to be made to see if the existing Lone Working Policy is being properly implemented.
- Ensure that the foundation engineering students are aware that they are able to use the secure bike sheds.

Access for users with mobility issues

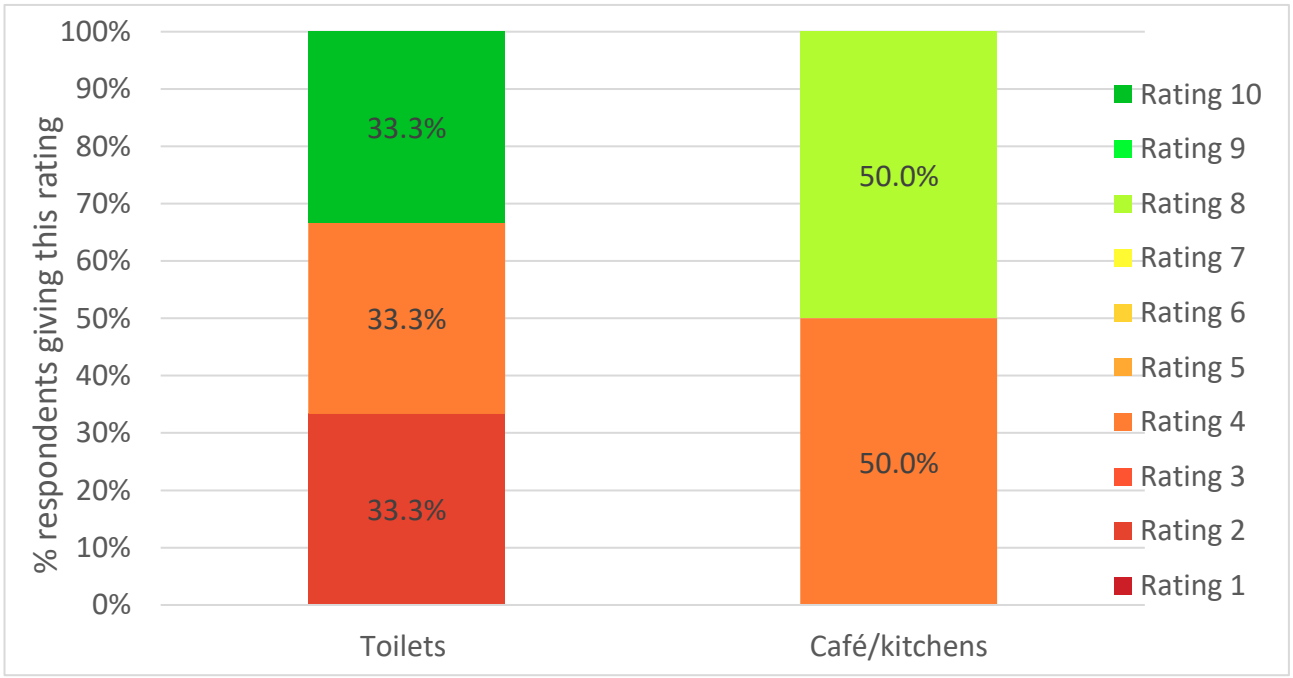
It is believed that disabled access has been adequately considered within the design of the building. Two lifts enable movement to upper floors for wheelchair users, and there are wide doorways and doors that open automatically. The kitchen is designed to be used by disabled users and there are accessible sinks in the toilets. The building meets regulations.

However, it was noted that this is difficult to assess this properly as testing is not in place for this aspect of the building's performance.

Recommendations

- Look at facilitating testing from a wheelchair user to check door widths etc.

FEEDBACK RELATING TO FACILITIES AND SOCIAL INTERACTION



Toilet facilities

'…you rarely see a clean toilet. I don't use them when I'm at work and other colleagues are the same.'

The installation of unisex toilets has not been popular with some end users. There has been a split along staff and student lines, with students relaxed about the gender-neutral toilets and staff often preferring men and women only units. Local management of the issue has been required, with the reallocation of some toilets as women only. One respondent commented that the installation of urinals for men would have saved on space.

As previously mentioned, the location of a disabled toilet attracted some discontent, with the sound of flushing and a hand dryer audible in neighbouring teaching rooms. Changes to building use, occurring as a consequence of the late arrival of the foundation engineering students into the process, meant the toilet was located next to a teaching space, with no intervening gap as would typically occur.

The toilets themselves came in for criticism from end users, with the flushing functionality described as poor. The inclusion of low 'accessible' sinks could cause backache for those users without accessibility issues.

The issue of cleanliness that overshadowed the building during early occupation was felt keenly with regard to the toilet facilities. Poor maintenance and cleanliness have led to some users avoiding using them if possible. It was noted that the splashbacks behind the hand dryers get dirty.

The newly installed foundation engineering students have also placed an additional demand on the toilets, with cleanliness suffering as a consequence. Their standard of hygiene may be lower than that of staff, and it was suggested that a plan to 'flood [the building] with additional cleaners,' at the start would have helped mitigate this.

Recommendations and actions

- The provision of gender-neutral facilities is to be addressed by the Equality, Diversity and Inclusion Committee, with a policy-based approach due to arrive in 2020.
- The main contractor has committed to looking at providing insulation to the disabled toilet situated next to the lecture theatre, to reduce the noise pollution from the toilet facilities.

Café

The café was a late addition to the building and received mixed feedback. It was appreciated that this had been made to happen and this was attributed to collaborative working between the main contractor and the subcontractors.

The café is well used but some respondents considered it to be small and expensive. One stakeholder pointed out that although the selling space was relatively small, the space for users to sit and consume items purchased from the café includes the whole of the atrium floorspace.

Ultimately, end users are pleased to have this facility as many of the University's other buildings do not benefit from a café. The Head of Capital Projects pointed out that, without the presence of the foundation engineering students, the café would not be viable, so end users reluctant to accept the presence of this younger cohort are actually benefiting from these students being there.

Recommendations and actions

- Requests from the foundation engineering students that the café has longer opening hours, particularly before lectures commence at 9am, are currently being implemented.
- Look at increasing the density of seating provision within the atrium to accommodate more users of the café, and to give the foundation engineering students more individual study spaces.

Staff room

The staff room is regarded as a 'beautiful' room with a wow factor. However, that doesn't mean it effectively meets user needs in the opinion of one stakeholder. Whilst it is great for things such a holding open days and conferences, it is too big to conduct sensitive conversations. It is dominated by the teaching staff on the foundation engineering course, with other academic staff using it rarely.

The kitchen is small and dominated by post-graduate researchers. The theme here seems to be that these social areas don't yet facilitate true mixing between different cohorts. It would be beneficial to 'staff well-being to encourage positive relationships between teaching and research staff'. The foundation engineering students were unsure whether they were allowed to use these facilities and as a consequence tended not to for fear of causing an issue with the existing users.

There is a lack of plug sockets in the kitchen, and the accessible sinks give users without accessibility issues backache.

Recommendations and actions

- A decision was taken that the foundation engineering students should be allowed to use the kitchen areas within AMB.
- The use of kitchen facilities by the foundation engineering students should be publicised to this cohort, alongside clear guidance on how to use the facilities.
- The existing users of the kitchen areas should be made aware that the foundation engineering students will be using these areas; encouragement should be given to making these students feel welcome.

FEEDBACK RELATING TO THE PERFORMANCE OF THE BUILDING AGAINST SUSTAINABILITY AND ENERGY TARGETS

Energy consumption for the Advanced Manufacturing Building was predicted to be about 300k KW hours a year, for known demands. At the time of interview, it had billed at 807KW, so the building is significantly over original predictions, but this includes research and operational demands, so the two cannot be sensibly compared. It would be prudent to try and define these additional loads in future designs.

BREEAM accreditation was achieved but only for the office areas because the laboratories are different; 'it [BREEAM] was only going for excellent and not outstanding'. The only thing that was challenging was the requirement for risk assessments before the research projects had started.

There are elements that, from an environmental perspective, could have been improved. Installation of daylight sensors could have optimised energy performance; for example, daylight linking of the lights in naturally lit areas [such as the atrium] would have helped. With regard to the atrium, it was explained that there had never been any intention of using sensors for this part of the building; this needs to be manually controlled as the light varies considerably from the top to the bottom of this large space.

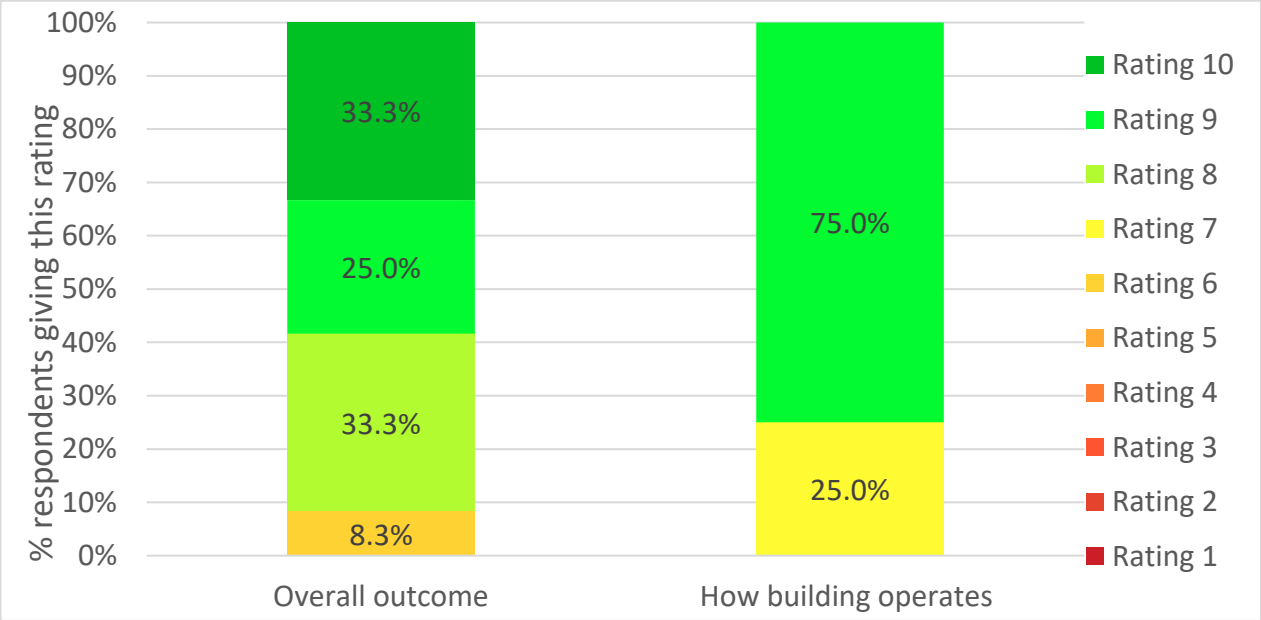
One stakeholder commented that although there are solar panels on the roof of the building these 'smacked of tokenism'. However, other stakeholders took issue with this, noting that the solar panels are only one plank of a wider, less visible strategy. For example, more efficient equipment has been installed throughout the building.

In addition, a key aspect of the building's contribution to the benefit of the surrounding environment, is the large attenuation tank that sits under AMB. This stops storm water pushing into the neighbouring river; without this, the storm water would have a much greater negative impact on the local area. This is, of course, completely invisible to end users and the wider community.

Recommendations

- Take steps to improve end users' knowledge of the energy efficient / sustainable aspects of AMB, perhaps through the provision of information within the exhibition space.
- Consider mechanisms for improved energy in use predictions.

CONCLUSION



Achievement of the Vision

There can be little doubt, from the feedback gathered during this process, that the Advanced Manufacturing Building, despite some issues, is a highly successful, much valued building for the University of Nottingham. It serves as the impressive gateway to the campus that the University was looking to achieve, with feedback from end users citing high levels of pleasure at the attractive, state-of-the-art façade that AMB presents to the world.

Stakeholders commented that industrial partners and visitors to the Advanced Manufacturing Building are impressed by what they see, with an end user from the Faculty of Engineering believing that it is attracting a high calibre of PhD students. It is regarded as welcoming, with a relaxed ‘vibe’.

The words ‘exemplar building’ were used several times to describe the Advanced Manufacturing Building. Whether this was to describe the provision of fixtures and fittings that suit modern teaching and learning methods, or in the delivery of a building that works towards reducing the barriers between teams, one stakeholder believes that AMB offers ‘real step change’ for the University of Nottingham, and should be replicated elsewhere.

There have undoubtedly been issues with elements of the project such as the soft landing, cleaning and, most importantly, the late inclusion of the foundation engineering students into the process. However, balanced against that, is feedback from the foundation engineering students themselves, who like to be taught alongside the research teams and appreciate opportunities to see the research team in action. There is scope to find strategies to increase the sense that foundation engineering students are both welcome in the building and important members of the community.

Overall, as one member of the workshop group commented, ‘If this is all we have to be concerned about, we should consider ourselves as having done a good job.’ All members of the teams involved should congratulate themselves on the successful delivery of a wonderful building.

APPENDIX I: SUMMARY OF RECOMMENDATIONS

RECOMMENDATIONS FOR APPLICATION TO FUTURE PROJECTS

Design

- Where changes in the planned use for a facility occur midway through a project, ensure that sufficient time is given to considering impact on all aspects of design, and for stakeholders to take onboard changes and think through relevant strategies for coping.

Handover

- Ensure there is a clear definition of 'soft landing' agreed between all stakeholders before the project commences.
- Hold a meeting either during procurement, or early in the construction phase, to discuss the soft-landing phase and begin preparations early.
- Review preparations before soft landing begins; tweak the ongoing process as required.

Cleaning and maintenance

- Create a plan for cleaning, with a protected budget, for at least a year after practical completion.
- Take steps to ensure that the plan is prepared and implemented from the very beginning of the building's occupation.
- Ensure that the maintenance team gets involved earlier in the project journey.
- Early and prolonged engagement with the maintenance team would reduce any issues caused by a lack of training.
- Work with the maintenance team to identify training themes that would be most useful to them.

Gender-neutral WCs

- The provision of gender-neutral facilities is to be addressed by the Equality, Diversity and Inclusion Committee, with a policy-based approach due to arrive in 2020.

RECOMMENDATIONS FOR POST COMPLETION CHANGES TO THE BUILDING AND ITS MANAGEMENT

Cleaning

- Instruction should be given to cleaning staff to make sure that walls are wiped down properly.

Maintenance

- A plan should be implemented to retouch the black paint, where possible.

Seating

- Increase the density of seating provision within the atrium so that there is more available space for the foundation engineering students to study either individually or in groups.

Noise levels

- Training for users and new members of the maintenance team on how to close the partition door properly, and thus seal it acoustically, is required. This should rectify the issue of noise pollution from one lecture theatre to another.

Security

- Encourage end users to take responsibility for improved security by ensuring the building's side doors are always properly and completely closed. New signage could emphasise this point for building users.
- Feelings of isolation and trepidation amongst end users working in the building at night or at the weekend need to be raised with the faculty and dealt with under the faculty's 'Lone Working Policy'. Checks need to be made to see if the existing Lone Working Policy is being properly implemented.
- Ensure that the foundation engineering students are aware that they are able to use the secure bike sheds.

Access for users with mobility issues

- Look at facilitating testing from a wheelchair user to check door widths etc.

Gender-neutral WCs

- The main contractor has committed to looking at providing insulation to the disabled toilet situated next to the lecture theatre, to reduce the noise pollution from the toilet facilities.

Café

- Requests from the foundation engineering students that the café has longer opening hours, particularly before lectures commence at 9am, are currently being implemented.
- Look at increasing the density of seating provision within the atrium to accommodate more users of the café, and to give the foundation engineering students more individual study spaces.

Making clear which users may access which facilities

- A decision was taken that the foundation engineering students should be allowed to use the kitchen areas within AMB.
- The use of kitchen facilities by the foundation engineering students should be publicised to this cohort, alongside clear guidance on how to use the facilities.

- The existing users of the kitchen areas should be made aware that the foundation engineering students will be using these areas; encouragement should be given to making these students feel welcome.

Sustainability of the building

- Take steps to improve end users' knowledge of the energy efficient / sustainable aspects of AMB, perhaps through the provision of information within the exhibition space.

APPENDIX II: FEEDBACK FROM POST-GRADUATE RESEARCHERS & FOUNDATION ENGINEERING STUDENTS

This feedback in this section was collected from a focus group comprising five foundation engineering students and from telephone interviews with two post-graduate researchers. Charts summarising the quantitative satisfaction scores given by these participants can be found in Appendix II.

FEEDBACK FROM THE FOUNDATION ENGINEERING STUDENTS

On 2nd October 2019, Building Understanding moderated a focus group involving five former foundation students, each of whom had completed a full academic year of study based in the Advanced Manufacturing Building. The focus group lasted for 90 minutes.

Positive feelings about the building

The respondents expressed positive feelings about the AMB, describing the building as being new, clean and well-lit. Four out of five were enthusiastic about the external appearance of the building and all appreciate the open 'heart-space' of the building.

The café and the kitchen

The café is seen as a benefit although it can take time to get served. One student suggested that it would be good if the café could open one hour before lectures begin.

The students need some clarity on whether or not they are able to use the kitchen area. They feel that this area is for staff and post-graduates but would welcome the ability to use the kitchen as it would save them money.

The exterior of the building

Four out of the five respondents think that the AMB is an attractive and striking building. The one exception described the building as "ugly" and a "dirty yellow colour".

The interior

The building has a spacious feel. Students like the open heart of the building and also like the staircase.

The seminar room

This space received criticism from one respondent who felt it was like a school classroom. Other respondents were satisfied with it and one commented positively on the screens at the back of the room.

The computer lab room

The only issue reported with this room is that it can be difficult to get the chairs around the table (because of their shape/design).

Room C29
The room where the focus group was held is only available to the students when it is empty, usually after 6pm. It is a good space for group work and for doing presentations.

AV equipment
No negatives were raised regarding the AV equipment. There were no complaints about the Smart Boards. Students like the fact that cameras are used to relay clearly what lecturers are writing on the boards. Lectures have been available online to download.

Quality of fittings and wear and tear
The students had no negative observations of the quality and durability of finishes, paint and carpet.

Noise
The respondents had no issues with extraneous noise from areas such as the washrooms or from birds on the roof. If anything, the students feel that the building is too quiet. It definitely feels like a workspace and like a research environment rather than a University teaching environment. One student commented that “it feels more like offices”.

The AMB feels like the place that they come to for lessons. The issue is that, in reality, for the foundation students, it is the main part of their University experience.

Temperature
Aside from one comment about the Seminar Room being a little cold on occasion, there were no negative comments about the temperature in the AMB.

Toilet facilities
Again, the respondents had no problem with the unisex toilets and actually like the fact that they have their own space and some privacy to change clothing, for instance, one student had to change to go to work after lectures. One said that having their own space made them more inclined to leave it tidy.

There was one report of the toilets flooding and a toilet seat having broken but there were no complaints about cleanliness of the toilets.

Showers
The students welcome the fact that there are showers available, although none of our respondents had used them.

Accessibility
No issues were reported regarding accessibility for students with mobility issues.

Maintenance
The maintenance and the standard of cleanliness in the building is considered to be good.

Security

Lighting around the building is good. Some had visited the building late at night and had no security concerns other than it felt a bit eerie, with the reception not being manned. There were no major issues with security. One respondent questioned whether the building needed to be accessible 24/7.

Feelings of isolation

The respondents spoke about the fact that they feel isolated from student life. Apart from one single slot per week, their mostly nine-to-five timetable is spent solely within the AMB. Unless they happen to be in the same hall of residence as other engineering students, it is hard to get to know students who may be in the first or second year of a degree course in engineering. This type of interaction is valuable in helping them decide which type of engineering (civil, mechanical etc) to pursue.

The respondents said that it can be hard even to get to know students in the opposite cohort of foundation students.

No space for study or to socialise

The respondents feel that they are unwelcome in the building and think that they are something of an irritant to the post-graduates. If they sit on the sofas, post-graduate students complain that they are making too much noise and disturbing their work.

There is no space to sit to do coursework together or individually as all the study spaces are either for the post-graduates or for the staff. The cohort needs somewhere to co-exist. There is a lack of individual study spaces and access to computers.

The foundation students appear to have a rather ‘sterile’ experience within the AMB. Individuals spoke about their disappointment with the reality of their experience against their expectations, having viewed the engineering campus on open days.

They need somewhere to go between lectures, like the areas provided in the George Green Library, or the table tennis room in the Pope Building. Two of the students said that they went to the local pub, The Rose and Crown, between lectures as there was nowhere else to go.

The foundation students feel awkward in the AMB.

It was felt that, while the Jubilee Campus has better buildings than University Park, the student experience is not so good. One student said that the Jubilee Campus is for business and computer science.

One issue is getting the post-graduates in the building to accept and welcome the foundation students and there was some discussion about how this could be achieved.

Facilitating social interaction, mentoring and inspiration

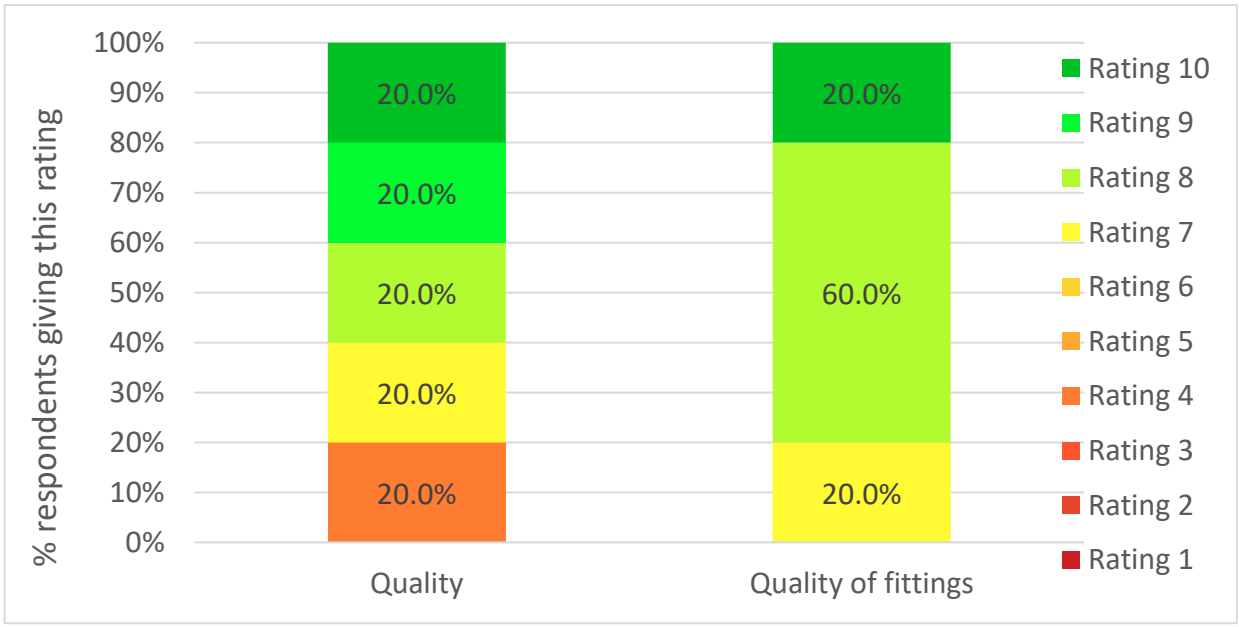
There is an opportunity for the foundation students to benefit and be inspired by the work that the post-graduates do and the work in the ‘factory space’. One respondent said that he would have been excited to learn about the aeroplane engine in the factory space but that there was no opportunity to do so.

The foundation students would welcome more understanding (maybe a presentation) about the other work that goes on at the AMB and that this may inspire their future careers.

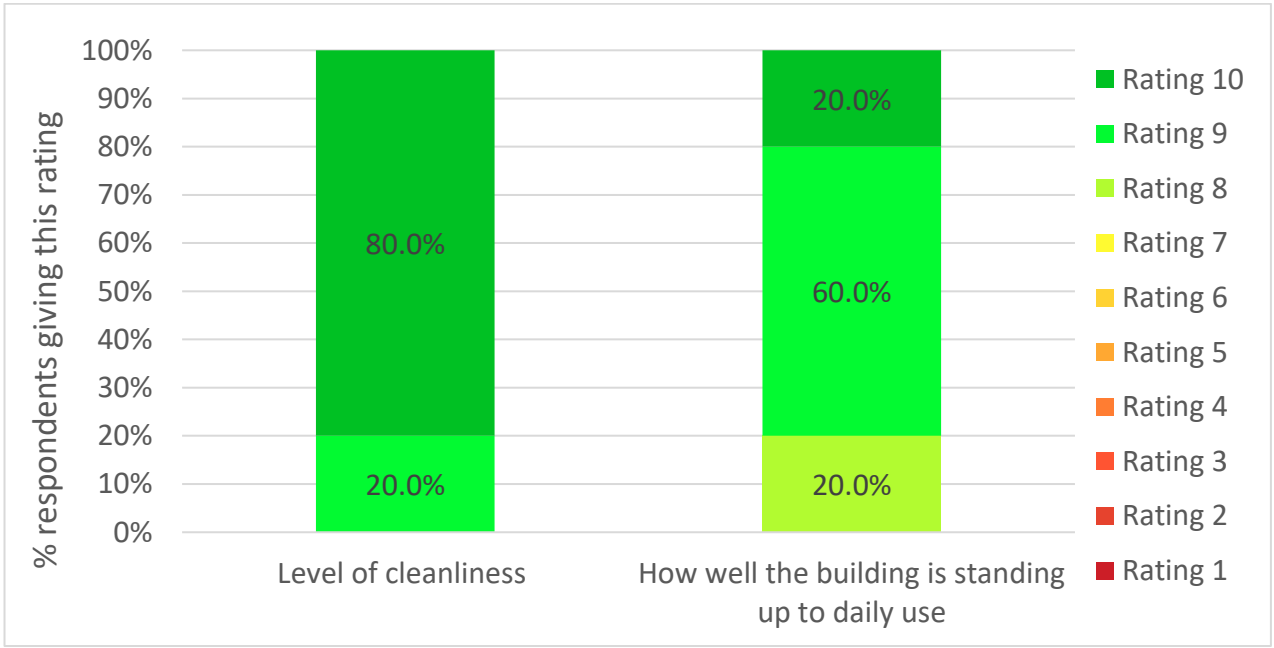
There was a lot of interest in building stronger links with the opposite cohort of foundation students, through a society and through social events (lie football tournaments). The post-graduates could also attend the social events.

There was some interest in the post-graduates being mentors to the foundation students.

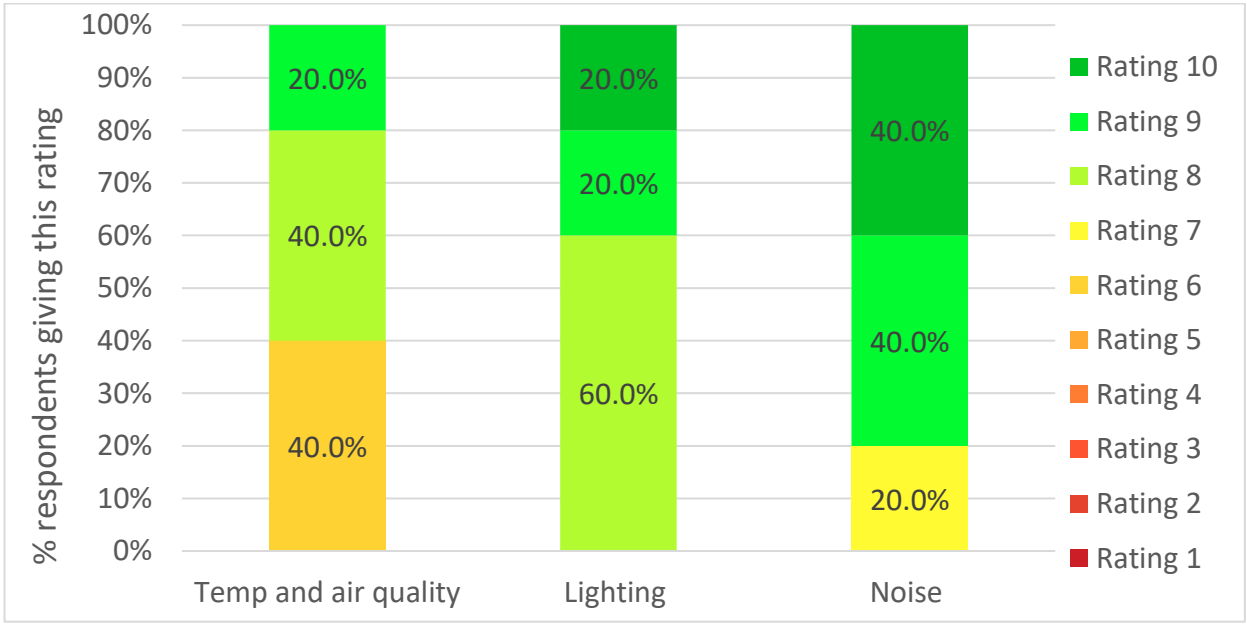
Foundation students' feedback on the quality of AMB



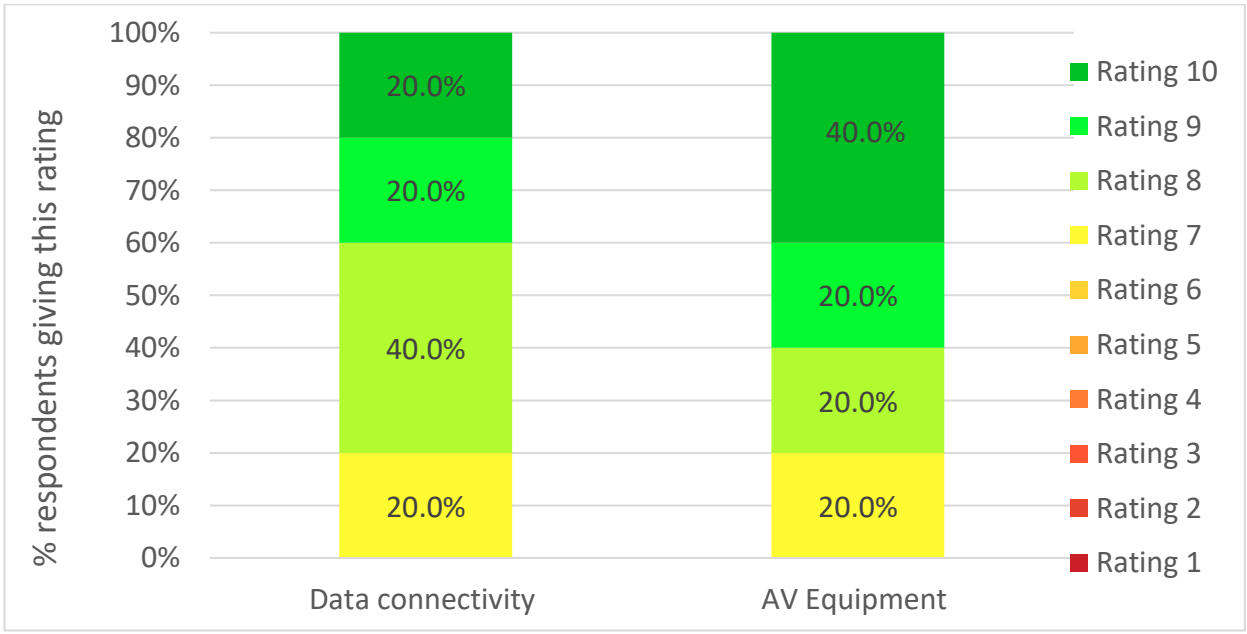
Foundation students' feedback relating to the cleanliness and maintenance of AMB



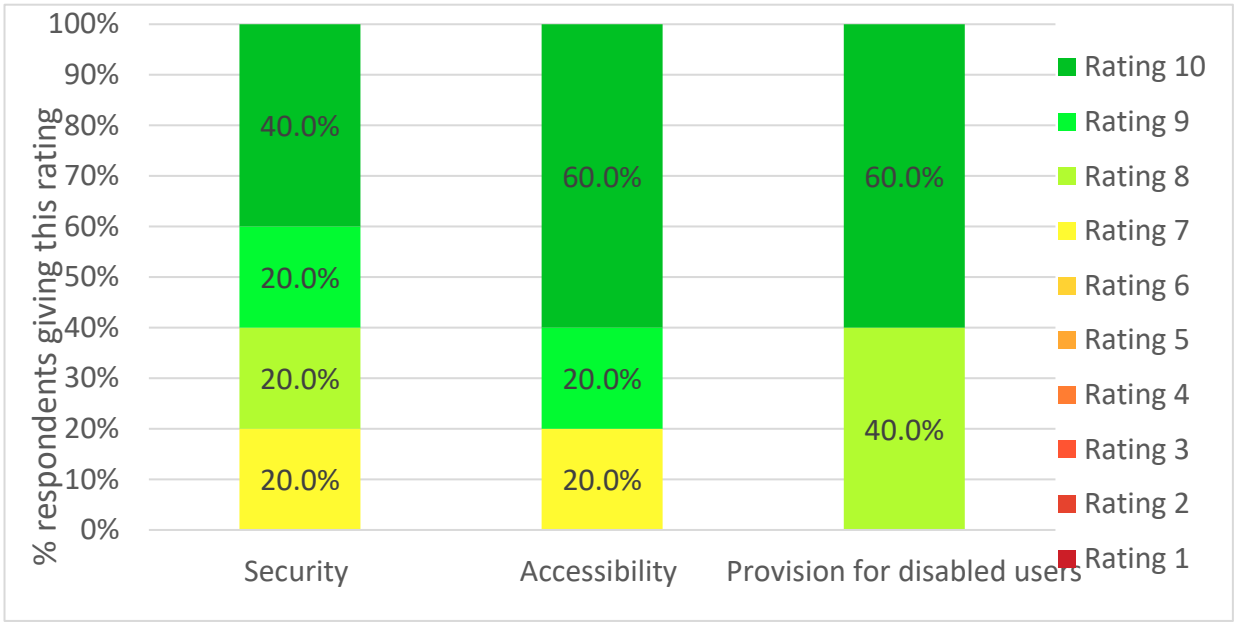
Foundation students' feedback relating to the quality of the internal environment in AMB



Foundation students' feedback relating to equipment in AMB

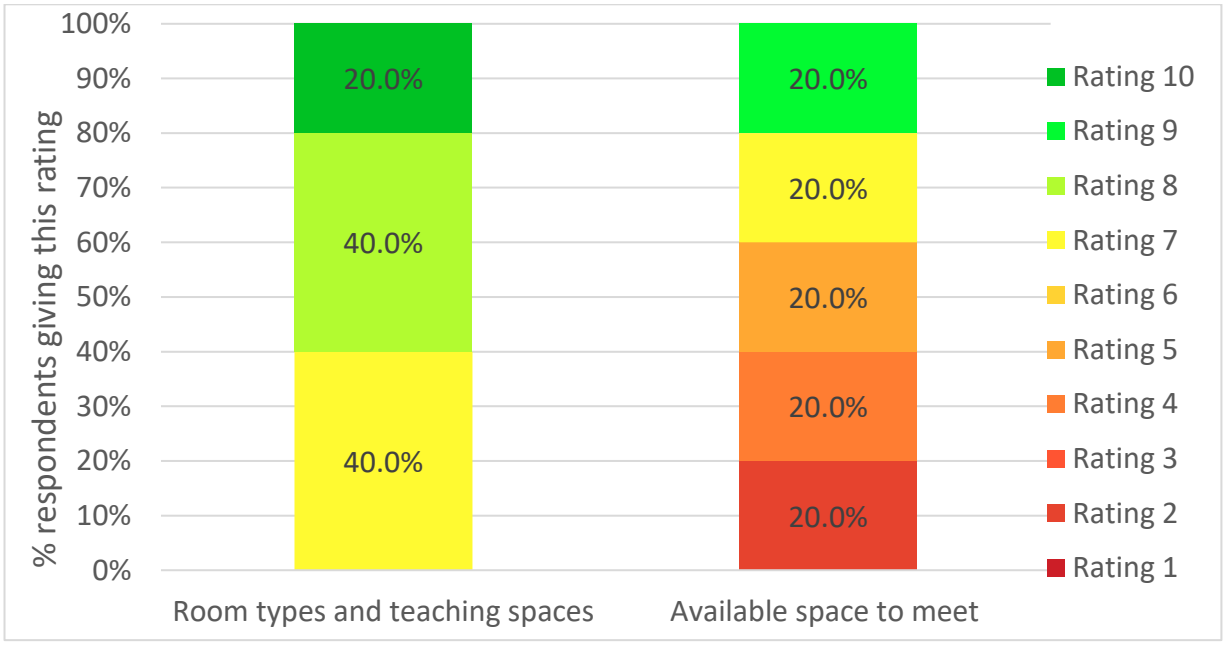


Foundation students' feedback relating to security and access in AMB

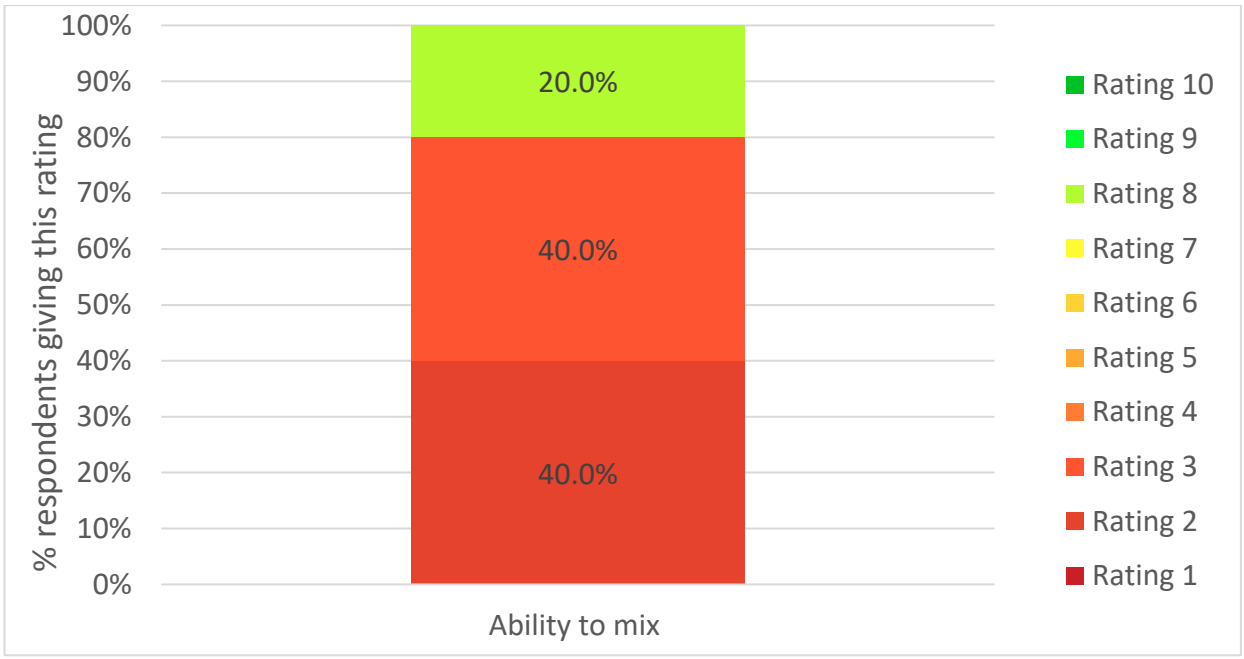


Foundation students' feedback relating to facilities in AMB

Foundation students' feedback relating to room types and available space



Foundation students' feedback on their ability to mix with other AMB user groups



Foundation students' feedback on their overall satisfaction with AMB

FEEDBACK FROM POST-GRADUATE RESEARCHERS

Positives

In summary, the feedback gathered from telephone interviews with two post-graduate researchers contained many positives.

The respondents feel that the quality of the AMB is high and that the building compares very favourably with other facilities on campus. One participant commented that it "makes you want to work there". The respondents feel that have what they need in order to conduct their research effectively.

Ratings for their overall satisfaction with the building stood at 'nine' and 'ten'.

The rooms are fit for purpose and the kitchens, breakout spaces and the staff room are considered to be useful

According to the post-graduate researchers, the building is usually clean, although there is a difference when foundation students using the building, due to the volume of additional people.

Negatives and suggestions for improvements

While the temperature in the main areas is good, the temperature in the open-plan offices can be cold.

While the glass offices help with availability of light, this does create a lack of privacy for meetings, and can be distracting.

More quiet space/meeting rooms (like those available in the library) for one-to-one meetings would be welcomed.

The entrance area would lend itself to a display to publicise the work happening in the building.

The seating areas are often occupied when foundation students making it “a little bit difficult for the building to function well when they are there.”

One participant suggested lockers for the storage of lab coats and equipment would be helpful.