Principles in Patterns (PiP): Evaluation

WP7:38 Impact and process evaluation

Piloting of C-CAP: Evaluation of impact and implications for system and process development

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1. Introduction

1.1 Evaluation background

The Principles in Patterns (PiP) project is leading a programme of innovation and development work intended to explore and develop new technology-supported approaches to curriculum design, approval and review. It is anticipated that such technology-supported approaches can improve the efficacy of curriculum approval processes at higher education (HE) institutions, thereby improving curriculum responsiveness and enabling improved and rapid review mechanisms which may produce enhancements to pedagogy [1], [2]. Curriculum design in HE is a key "teachable moment" and often remains one of the few occasions when academics will plan and structure their intended teaching [3]. Technology-supported curriculum design therefore presents an opportunity for improving academic quality, pedagogy and learning impact. Approaches that are innovative in their use of technology offer the promise of an interactive curriculum design process within which the designer is offered system assistance to better adhere to pedagogical best practice, is exposed to novel and high impact learning designs from which to draw inspiration, and benefits from system support to detect common design issues, many of which can delay curriculum approval and distract academic quality teams from monitoring substantive academic issues, e.g. [4], [5].

The rapid generation of new programmes of study, or the rapid adaptation of existing curricula, is also increasingly necessary. Institutions need to better respond to quickly changing academic contexts, the changing demands of employment marketplaces and the expectations of professional bodies [1], [6], [7]. Disciplines within the sciences and engineering appear to be particularly exposed to these pressures, with new technological or environmental developments increasingly necessitating the re-engineering of curricula or the rapid embedding of new skills [7], [8]. This scenario is also influenced by the globalisation of the HE sector more generally [9], [10] which, within the realm of curriculum design and approval, is placing additional pressure on institutions to devise specialist curricula designed to attract international students and/or suitable for delivery at international branch campuses [10–12]. Ensuring that high levels of academic quality are maintained also adds a further layer of complexity to an HE curriculum design and approval scenario that requires increasing levels of responsiveness and learning impact [1], [7].

This strand of the PiP evaluation (WP7:38) attempts to understand the impact of the PiP Class and Course Approval Pilot (C-CAP) system within specific stakeholder groups and seeks to understand the extent to which C-CAP is considered to support process improvements. As process improvements and changes were studied in a largely quantitative capacity during a previous but related evaluative strand [4], this strand includes the gathering of additional qualitative data to better understand and verify the business process improvements and change effected by C-CAP. This report therefore summarises the outcome of C-CAP piloting within a University faculty, presents the methodology used for evaluation, and the associated analysis and discussion. More generally this report constitutes an additional evaluative contribution towards a wider understanding of technology-supported approaches to curriculum design and approval in HE institutions and their potential in improving process transparency, efficiency and effectiveness.

As the report will explain, data found participants to support many of the findings from previous evaluative strands. System perceptions were generally positive across stakeholder groups. C-CAP was found to clarify expectations, better support simplicity in the drafting process, improve process transparency and visibility, enhance process control, and solve a variety of document management and workflow issues. C-CAP's renewed focus on those aspects of curriculum design that are integral to good pedagogical practice and to high academic quality standards has reduced the bureaucratic burden normally associated with the previous state. This has the simplified academic review and has delivered a system that is less likely to stifle innovation. The curation of curriculum designs as

"knowledge assets" in a central repository was also considered to support a number of key academic quality processes and better enable responsive curriculum design. Data supported the view that C-CAP functioned as a platform from which to disseminate explicit and tacit curriculum design practice, and would maximise the value of institutional knowledge assets by enabling the re-use of curriculum designs. However, the report also highlights evidence of systems resistance among academic users and a need for academic quality staff - many of whom function as key change agents and are integral to the acceptance of C-CAP - to undergo C-CAP "best practice" training. The aforementioned findings, and many others, will be discussed in further detail throughout subsequent sections.

This is the fourth and final strand report to be delivered as part of the PiP Evaluation Plan [13]. Previous reports are:

- Evaluation of systems pilot (WP7:37) - Heuristic Evaluation of Course and Class Approval Online Pilot (C-CAP) [14]
- Evaluation of systems pilot (WP7:37) - User acceptance testing of Course and Class Approval Online Pilot (C-CAP) [5]
- Evaluation of impact on business processes (WP7:39) - Critical analysis of BPI technique and Course and Class Approval Pilot (C-CAP) within class and course approval [4]

1.2 Relationship to strand WP7:39

Evaluation strand WP7:39 (Evaluation of impact on business processes) [4] analysed the business process techniques used by PiP, their efficacy and the impact of process changes on the curriculum approval process. A variety of evaluation techniques were used to facilitate comparative analysis, thus enabling an impact assessment of the extent of changes between the "new state" (i.e. using C-CAP) and the "previous state". Stage 6 of Kettinger et al.'s [15] Stage-Activity (S-A) Framework was used to direct aspects of this strand of evaluation.

Figure 1: Overview diagram of PiP's evaluation strands; note the recursive relationship between WP7:38 and WP7:39.

Stage 6 ("Evaluate"; S_6A_1) documents a suite of suggested evaluation techniques that can be used in the evaluation of business process change. Whilst a variety of quantitative techniques exist within S_6A_1 - some of which were used in WP7:39 - Kettinger et al. [15] and others [16] comment on the prominence that should be given to qualitative data sources (e.g. group interviews) and their role in understanding overall process performance. No such qualitative data was collected or reported upon

in WP7:39. Instead it was reported that qualitative data collected in this evaluative strand (WP7:38) would feed into the aims and objectives of WP7:39 (see section 2.2). This approach is entirely consistent with the PiP Evaluation Plan [13] which notes the recursive nature of the evaluative strands. The recursive elements of the evaluation strategy are diagrammed in Figure 1 and discussed elsewhere [17] in more detail.

2. Methodology

2.1 Aims

The PiP Evaluation Plan details the wider objectives of the project evaluation [13]. This strand of the PiP evaluation aims to better understand the impact of C-CAP within specific stakeholder groups. It seeks to understand the extent to which C-CAP is considered to support curriculum design and, more specifically, the approval process. As noted in section 1.2, an important aspect of this evaluative strand is to complete the qualitative data collection considered by Kettinger et al. [15] as integral to the S_6A_1 framework. The following broad research objectives therefore influenced the qualitative data sought for this evaluative strand:

- The extent to which C-CAP effected change within institutional processes
- Eliciting and capturing data and evidence of the nature of change, efficiencies, outcomes, attitudes, etc.
- The nature of identified changes across stakeholder groups (e.g. patterns, discords, synergies, etc.)
- The aspects of C-CAP stakeholders consider has the greatest potential for institutional change and which have effected greatest change in the curriculum design and approval roles normally assigned to specific stakeholder groups
- The extent to which the "three orbs model" – described in a recent PiP blog post [18] and the outcome of conclusions drawn from user acceptance testing conducted in strand WP7:37 [5] – accurately models curriculum design and approval reality.

It was also a requirement of this evaluation that additional qualitative data be gathered to validate specific findings from WP7:39, thus better understanding the nature of the business process improvements and changes effected by C-CAP. Additional qualitative data was therefore sought on the following aspects of WP7:39 for validation purposes:

- *Qualitative benchmarking*: A comparative qualitative benchmarking process was used in WP7:39 to establish whether five principal process and document workflow issues identified as part of the PiP baselining exercise [19] in the "previous state" had been addressed in the "new state" [4].
- *Pareto analysis:* Pareto analysis and charting was used in WP7:39 to identify and prioritise the most common problems under the "previous state" [4]. This problem data was then used to assist in assessing the potential impact of C-CAP on approval processes ("new state"). Some of the issues highlighted by the Pareto data were not addressed satisfactorily in the "new state" and a conclusion of WP7:39 was therefore that the qualitative components of S_6A_1 should seek to identify "potential system support functionality" [4].

Further triangulation of aspects of WP7:37 (User acceptance testing of C-CAP) [5] was an underlying objective, e.g. gathering general comment on perceptions of the C-CAP system and how it support disparate staff roles.

2.2 Faculty piloting of C-CAP

To provide a suitable basis for the evaluation of the above noted objectives, C-CAP was piloted within the Humanities & Social Sciences (HaSS)[*] faculty for three months starting from mid-March 2012.

[*] Acknowledgement and thanks is extended to the HaSS faculty and their Academic Quality Support Team for participating in the piloting of C-CAP.

Note that C-CAP was also piloted, albeit in a more informal capacity, within the Strathclyde Business School (SBS) and the Faculty of Science; however, piloting in these faculties was limited to "dummy" proposals as neither faculty had the administrative capacity to participate during the timescale required.

A HaSS specific implementation of C-CAP was created (Figure 2). Discussions with the HaSS Academic Quality Team identified two academics who intended to design new curricula and that were willing to participate in piloting. Their involvement generated one post-graduate course and four classes that were each used as the focus for piloting.

Figure 2: HaSS implementation of C-CAP. Screen dump of HaSS C-CAP home page, including status list of current / recent curriculum proposals.

Piloting involved participation from members of the following stakeholder groups:

- *Academics*: Academic staff responsible for designing and – if approved - delivering the curricula proposed.
- *Faculty Academic Quality Team*: Staff within the Faculty responsible for managing Faculty level curriculum approval processes and academic quality assurance.
- *Academic Quality Working Group*: A working group of academics from within the Faculty responsible for reviewing and providing feedback on proposed new classes and/or courses. The Academic Quality Working Group provides an initial level of academic scrutiny prior to consideration by the Faculty Academic Committee.
- *Faculty Academic Committee*: Academic Committee is the mechanism by which proposed curricula (specifically courses) are scrutinised, reviewed and formally approved (or not) by senior members of the Faculty. Successful approval at Academic Committee essentially concludes Faculty level approval processes, after which a number of University processes are initiated.
- *Student Lifecycle*: Student Lifecycle is located within the Student Experience and Enhancement Services Directorate (SEES) and is broadly analogous to registry. Whilst Student Lifecycle is responsible for a wide range of administrative services at the University of Strathclyde, their remit within the curriculum approval processes is to assign class/course codes, record aspects of curriculum data for monitoring, registering news classes/courses in the catalogue, and so forth.

- *Ordinances and Regulations*: Ordinances and Regulations and its Committee is responsible for ensuring newly proposed curricula comply with the various statutes, ordinances and regulations, and the other rules and procedures of the University. Representatives from Ordinances and Regulations act on behalf of – and report to – Senate as appropriate on all matters pertaining to regulations.

The class approval process was modelled and piloted in its entirety using C-CAP. All classes that were designed, approved and piloted with C-CAP therefore followed the process through to its conclusion. The course approval process was modelled and piloted up to Senate approval (the final process step). All curricula were successfully approved. Final Senate approval was omitted from the course piloting because suitable procedures for communicating curriculum information to Senate have yet to be established. The senior membership of the Senate is such that organising such procedures and their participation would have delayed piloting unnecessarily. It should however be noted that this is simply an administrative issue rather a technical one. Further detail on the nature of the curriculum approval process, including process flow diagrams and rich diagrams, can be found in the WP7:39 evaluation strand report [4].

Prior to piloting all relevant stakeholders received one-to-one C-CAP orientation sessions, each tailored specifically to their role within the curriculum design and approval process. Dedicated training materials were also created to support stakeholders. These materials included written tutorials and demonstration videos (e.g. Figure 3) [20]. Training materials were delivered using the University of Strathclyde's Development & Training Gateway. It is anticipated that these materials will in future form an important training resource for the embedding C-CAP. Occasional phone support was also provided to stakeholders when required.

Figure 3: Screen shot of C-CAP training materials, as delivered by the Development & Training Gateway.

Figure 4: Example of the C-CAP administration screen, as viewed by users with academic quality staff permissions.

Whilst academics are at the centre of the curriculum design process, faculty quality teams are at the centre of - and are critically important to - the approval process. Academic quality staff are singularly responsible for administrating and managing the curriculum approval process and therefore have responsibility for tracking, providing on-going feedback, controlling the status of proposals, assigning

proposals for academic review, etc. Administering this functionality exposes quality staff to an extra layer of C-CAP system complexity (Figure 4). The back-end administration of the curriculum approval process via C-CAP is therefore mediated at a faculty level by academic quality staff and is best understood, not through process diagrams, but by a star-shaped interpretation of faculty level approval processes, as illustrated in Figure 5. Figure 5 models the approval process within the HaSS Faculty. Academic quality staff govern or mediate key decision points during the approval process and for this reason can also be considered as important agents of change. Their centrality to the approval process and their influence on curriculum design (via academics) is such that they are the stakeholders above all others who interact with C-CAP the most, are the most exposed to its functionality and benefits, and are therefore best placed to advocate its wider adoption.

Owing to the extra technical burden assumed by the Academic Quality Team in piloting C-CAP, on-going email and phone support was provided throughout the piloting period for Team members, in addition to dedicated orientation sessions.

Figure 5: Star-shaped interpretation of HaSS Faculty level approval processes (for course approval), with the Faculty Academic Quality Team at the centre of administrating and managing the curriculum approval process.

2.3 Evaluation approach and methods

Two principal qualitative data collection methods were adopted for this evaluative strand: group interview method and the “Most Significant Change” approach.

Group interview

As well as fulfilling the stated evaluation aims, recall that an important aspect of this evaluative strand is to conclude the qualitative data collection considered by Kettinger et al. [15] as vital to the S_6A_1 framework. Qualitative data capture from stakeholders was achieved via the group interview method. The group interview technique was used instead of the focus group approach, owing to its success within organisational research contexts and its directed nature [21]. The weaknesses of such group method data collection techniques are well understood in the research methods literature [22], and the systems research literature more specifically [23]. The use of the group interview approach for this phase of the evaluation was nevertheless considered appropriate, not least because it is an important component of the S_6A_1 Framework; but because the organisational nature of this evaluative strand and its objectives necessitated a suitable data collection technique. Group method approaches are also considered one of the most appropriate techniques in organisational contexts [24].

Theorists and researchers within the domains of organisational theory and psychology note the importance of the "group method" for exploring and understanding institutional processes. For example, Steyaert and Bouwen [24] introduce a series of data collection techniques based on "natural" and "created" group contexts and delineate selection rules to aid the researcher in deploying the most appropriate technique based on research objectives. Using a case study approach, Sobreperez [23] also describes the unique properties and advantages of the group technique within information systems and IT research. Some scholars within the social sciences have proposed a typology of group method approaches such is their diversity [24]. In practice these typologies have been difficult for researchers to apply since the attributes of each approach often overlap and their respective flexibility renders redundant any attempt to classify them [25]. In general, group interviews, as opposed to focus groups, are considered most suitable when the phenomenon being studied requires the exploration and description of ideas. Group interviews are similar to focus groups but differ in their management and focus. In the group interview method the facilitator performs an active role in directing and structuring group discussions. By contrast, focus groups are more conducive to the generation of new ideas or concepts, with the facilitator assuming a more passive role, and often involves a group of homogeneous strangers (e.g. marketing or policy focus groups) [25].

Figure 6: Audio data and transcribed audio as prepared for analysis in NVivo 9.

A group interview pertaining to the piloting of C-CAP in HaSS was conducted with stakeholders after the above noted curricula had been approved and all subsequent processes had concluded (e.g. assignation of class/course codes, passage through Ordinance & Regulations, etc.). Group interview participants were drawn from the stakeholder groups involved in the piloting. Five participated in the group interview session. To support the direction and structure necessary for a group interview (rather than a focus group), a series of slides were used to direct participant discussion at the group interview (Appendix A). The content of these slides aligned with the evaluation objectives stated in section 2.1 and ensured relevant evaluation objectives were achieved. Slides pertaining to Most Significant Change were also included and are discussed in more detail below. The group interview was facilitated and managed according to best practice guidance provided by Steyaert and Bouwen [21].

Three stakeholder members were unable to attend the group interview and were instead interviewed individually. These interviews were conducted in their University office and followed the same essential format as the group interviews, including use of the slides to structure and direct participant discussion. A total of eight stakeholder members therefore participated in this aspect of the evaluation.

Both the group interview and individual interviews were sound recorded. Audio data were uploaded to QSR NVivo 9 for audio transcription, coding and further data analysis (Figure X) [†]. A "conventional" content analysis approach was adopted [26] and established coding and analysis methodologies were adhered to [27], [28].

Most Significant Change

An adapted form of the Most Significant Change (MSC) approach was deployed to assist in the identification of changes across stakeholder groups, as well as those aspects of C-CAP that have effected greatest change in the curriculum design and approval roles normally assigned to specific stakeholder groups. MSC is a participatory qualitative approach based on stories pertaining to the changes participants have experienced during and/or as a result of a particular project or initiative, rather than "abstract" pre-defined data indicators or metrics [29]. Qualitative research theorists and cognitive scientists have long reported the value of "story collecting" methods to understand complex research phenomena or systems, e.g. organisations and communities [30]. The MSC technique [29] can be classified as a story based method in which the changes participants have experienced in relation to a particular project or initiative are captured. Its popularity is manifest in its ability to capture secondary outcomes, such as those of personal significance to the participants or particular groups of participants [31], and its ability to promote dialogue through organisational or project hierarchies [30].

The MSC technique was originally developed by Dart [32], [33] as a novel approach to the monitoring and evaluation of complex rural development and international aid programmes [29], [31], [33], [34]. Such projects can be difficult to monitor or evaluate with conventional techniques, owing to their diffuse nature and multifarious outcomes. MSC - and specially adapted versions of the technique - has since found wide deployment within other communities of practice for similar reasons [31], [35–39] and is used often as a supplementary evaluation technique. Dart and Davies [29] note the most valuable aspect of MSC to be that data (i.e. stories) are based on "concrete outcomes rather than abstract indicators", thus enabling researchers and relevant stakeholders to make sense of complex project outcomes or changes. WP7:37 and WP7:39 have uncovered numerous "abstract indicators" and the use of MSC for this strand is therefore an appropriate complementary technique to ensure

[†] One participant expressed discomfort about the sound recording of their interview and the potential use of anonymised quotes in project reports. Responses from this participant could not be included in any content analysis. Data from this participant therefore do not feature in any analysis. Informal notes were instead taken during the interview and these informed conclusions but did not influence data analysis. This participant also preferred not to provide a Most Significant Change (MSC) story.

"concrete outcomes" are identified, thereby better informing the overall evaluation. Choy and Lidstone [31] summarise some further benefits of MSC:

- It offers genuine input from the participants' perspective;
- Its participatory nature often yields data on true impact and outcomes;
- It frequently draws out details of unexpected changes reflecting distinct individual and/or organisational values;
- It is not threatening to participants, e.g. "does not have a right or wrong answer and recognises two sets of opposing outcomes: expected/unexpected; and agreed/disputed meanings" [31];
- It "de-formalises" evaluation. Participants are encouraged to express what is most valuable to them and/or most important within their socio-cultural contexts, and;
- Participants are best qualified to comment (or share stories) on the most significant changes within their context. They are the "cultural insiders" with knowledge and understanding about the dynamic and multifaceted contexts of their environment(s).

When deployed as Dart and Davies [34] originally intended, the MSC approach involves the collecting of stories from stakeholders. These stories are collected over a pre-defined temporal period and focus on various "domains of change" (i.e. domains within which change should be expected). Stakeholders may be asked to produce several stories, depending on the length of the temporal period. Evaluators review all the stories when this collection period ends and select the "most significant" stories, thereafter these "winning stories" are circulated amongst "key influentials" to demonstrate project impact [32].

MSC has been adapted to better suit disparate areas of study [31], [35], [36]. In this instance the principal difference was the replacement of a *hierarchical* context with a *process* context. No project or organisational hierarchy existed in this instance, through which stories might percolate up and down and receive feedback – a typical MSC characteristic; rather it was a business process context involving numerous stakeholders. Stories were therefore not exposed to the same level of hierarchal scrutiny as there was no hierarchy through which they could traverse. This was considered an appropriate adaptation of the MSC approach since only a small number of stories were to be collected and the project context was not as defuse as those described by Dart and Davies [29].

MSC stories were collected from stakeholder participants towards the end of the C-CAP piloting period, with the curriculum design and approval process constituting the "domain of change". Participants were asked to document what they felt their most significant story was. To aid participants in documenting and structuring their MSC stories, a story template was created based on Davies and Dart's [34] story report format (Appendix B). The story template was circulated among all participants two weeks prior to the interviews via email. Participants were asked to complete the story template ahead of the interviews. The email also contained instructions describing the background of the MSC approach and the nature of the stories normally associated with MSC. Since the piloting period was relatively brief (two months), only one story was requested from each participant. Collected stories were then evaluated and the most significant selected for description in this present evaluation.

It was anticipated that not all participants would find the time to complete the MSC story template prior to the interviews. A further round of MSC was therefore administered at the group interview (see slides at Appendix A). In this instance interview participants were provided with a paper copy of the story template upon which to make notes about their most significant story, after which participants were asked to verbalise their story for audio capture and subsequent transcription by the evaluator. Participants were given 5-10 minutes within which to reflect upon their most significant change and make notes before being asked to verbalise their story. Verbalised stories were transcribed.

3. Findings and discussion

3.1 Coding framework

Analysis of the interview data produced a coding framework (Appendix X). This framework highlights the principal themes discussed by participants and details all sub-nodes, node definitions and indicative supporting quote(s). Node codes are included to indicate hierarchical level. Columns for data references are also provided using the following definitions:

- *Sources*: Sources refers to the number of individual data sources within which data has been coded at the associated node. In this instance there are three: one group interview source, and; two individual interview sources.
- *References*: References is a count of the number of selections within the source(s) that have been coded at a particular node.
- *Unique sources*: A unique source refers to the number of unique participants whose data has been associated with a particular node. Polyvocality is intrinsic to the richness associated with qualitative data [40]. Since one source within the dataset constituted a group interview and contained several unique participants, an additional level of polyvocality existed in the data which required further discrimination of participants (i.e. unique sources). Unique sources were listed and generated in NVivo using separate nodes (for each group participant) and by manually reviewing the group interview transcript and attributing them to specific participants.

For example, *Transparency* (T:5.3 – Appendix C) has 3 sources, 18 references and 6 unique sources. This means that there exists 3 sources (a mixture of individual and group interview data) within which 18 references to the node T:5.3 have been made. However, a unique source figure of 6 indicates that separate participants (i.e. unique sources) generated data that was coded at this node.

Table 1: General word frequency query, including synonyms. Top ten only.

Word	Length	Count	Weighted Percentage (%)	Similar Words
process	7	125	1.31	actions, advance, advancements, operate, operated, procedures, process, processes, serves, treated, treating, worked, working
course	6	96	0.97	classes, course, courses, nature, running
system	6	64	0.73	system, systematic, systems
approval	8	58	0.67	approval, approvals, approve, approved, approving
document	8	55	0.55	document, documentation, documented, documents, papers, support, supported, supportive, supports
faculty	7	54	0.54	faculties, faculty, module, modules
required	8	70	0.53	asking, demanded, essentially, expect, expectations, expected, expecting, involve, involved, involvement, involving, needed, needing, require, required, requires, taking, wanted, wanting
issues	6	62	0.52	effective, effectively, emerged, emerges, issues, matter, matters, number, numbers, outcome, outcomes, result, subject, subjective, supply, taking
people	6	44	0.50	masses, people
review	6	49	0.49	comment, comments, reader, review, reviewed, reviewer, reviewers, reviewing

The framework aided further querying of the data. Two super nodes were created: one containing thematic codes and another containing “emotional” codes (e.g. positive, mixed, negative, etc.). The latter node and its sub-nodes were used to facilitate data querying and did not reflect the intellectual content of the data. It has therefore been omitted from the framework in Appendix C. It is worth noting the relative simplicity of the coding framework compared to that produced by the analysis of protocol and stimulated recall data gathered in WP7:37 [5]. The directed nature of the interviews means that the present coding framework is much smaller and far less detailed. We nevertheless

restrict ourselves to further discussion of those nodes of substantive value. Note that discussion of the codes generally follows the structure of the interviews rather than the framework itself (see Appendix A for interview structure).

The result of a general word frequency query (with synonyms) is provided in Table 1 and diagrammed as a cloud in Figure 7. Whilst these word frequencies say little about the intellectual content of the interviews, they summarise their discursive content as "keywords" that relate to the curriculum approval process and the use of systems to help solve the issues therein.

Figure 7: General word frequency query on interview data sources, including synonyms, diagrammed as a cloud.

3.2 Curriculum design and approval under the previous and new state

Previous state: perceptions

Analysis of the data exposed participants' overall perception of the curriculum approval process under the previous state (*Previous state* [T:4]). Prior to this strand there was no opportunity to gather extensive qualitative interview data of the previous state, any discussion of the new state required a frame of reference for participants. Discussion of these issues was considered important in order to provide participants with an opportunity to reflect on the issues that impacted upon the curriculum design and approval process in the previous state. Since the activities participants perform in the approval process varies according to their role type (e.g. academic, academic quality, academic committee, etc.), a number of "significant issues" were cited by participants. Many of these issues demonstrated considerable overlap between process role types and included the following:

- Meeting the deadlines of Senate and the difficulties associated with creating associated "drafting timelines" for academic staff (*Process bottlenecks* [T:6.4]). For example:

  In terms of the Faculty it's more... meeting the deadlines for certain meetings that have to approve the actual classes or courses themselves. So it's actually the timeline between when someone approaches saying they want to design a new class or a new course, creating a timeline for them to then go through that process and meeting the deadlines for approval, so that classes or courses can be introduced. So the turnaround can vary in terms of when someone approaches to start writing a new class or course, getting that reviewed and then the feedback then recorded and sent back to the proposer, and then the feedback put into place for overall approval. So it's really the timeline is the most important thing for the Faculty. (Participant #5)

- Volume of paperwork and its duplication at various stages in the approval process (*Paperwork* [T:4.1]). Participant #1 provides an example:

> *There's a lot of paperwork, I think, to go through and I think some of the processes have to be duplicated, like asking for a class code at the end - y'know, there's a lot of that going on.* (Participant #1)

- Absence of process transparency and a lack of clarity about the process expectations and curriculum information requirements (*Transparency* [T:5.3]). Participant #3 described the "piecemeal" nature of the process:

> *Did you find it quite piecemeal? I found that I knew bits about it but didn't understand the whole process and that's why, when it came to doing it for the first time, it was like, phoning round lots of people trying to work out what all these different bit and pieces were...* (Participant #3)

It is interesting to note that the above issues correspond to some of those reported as part of the PiP baselining exercise [19]. They also received further treatment in recent evaluation activity [4]. Their significance in relation to the new state will be discussed in subsequent sections.

New state: perceptions, impact, change effected

C-CAP system perceptions were generally positive (*System perceptions* [T:10]), triangulating previous findings from user acceptance testing [5]. The simplicity of the drafting process in C-CAP was highlighted by a number of participants as particularly appealing. Those participants from the Academic Quality Team also noted the system's potential to minimise common process misunderstandings. Participant #1 stressed the system's simplicity and its ability to clarify expectations:

> *I think from a Faculty perspective we would get fewer queries from staff about certain aspects of curriculum design than we would, y'know, from the old system. I think a lot of the time they [academics] would come back and say, "I'm not exactly sure what this means...". Whereas the C-CAP system, I think, sets out... It's simplistic - they know exactly what's required of them. So I think that's very useful for them.* (Participant #1)

The potential for C-CAP to contribute towards a clarification of design expectations was associated with process transparency, which was also considered to have improved under the new state (*Transparency* [T:5.3]). Issues surrounding a lack of process visibility or transparency were reported as having been resolved in earlier evaluation activity [4] and its qualitative verification in this instance is therefore positive. Transparency was considered to have improved because C-CAP not only supported curriculum design by providing greater prescription in terms of the information expected in curriculum designs but also because it made transparent the various approval process milestones. Some minor system related limitations of C-CAP were identified by academic participants with regards to this area (*System logic* [T:10.1]); these will be addressed in due course via the PiP incremental systems development methodology [14], [41].

Academic Committee participants were similarly pleased about the improvement in transparency, particularly with respect to the delivery and capture of review feedback; but expressed concerns about some Faculty reviewing procedures, some of which remain mysterious and would therefore benefit from greater transparency (*Review of curricula* [T:9]). Under the previous state it was often unclear to Academic Committee whether appropriate discussion and analysis had taken place within relevant subject based teams, such that the proposal of a new class or course was both justified and properly supported by the relevant subject team. Central to this concern was the suspicion by Academic Committee that many classes and courses were being proposed based on the sometimes forceful will of a single individual rather than the collective will of subject groupings or departments. This concern is described in more detail by Participant #4:

> *I see the paperwork at the final stage of the whole thing. What interests me is the earlier stages of the process and how it is that the people who come to read the final paperwork can be confident that what's happened is, erm, a process of discussion at the subject level. Having read a number of class*

> *proposals over the last year or so, there isn't a very strong sense about whose work you are actually reading, whether it's essentially the work of one person... You're saying curriculum design and approval, and these are separate things - so, I think, the approval process should make it clear how the design occurred. In other words, whose involvement... It's not always been clear what kind of process goes on at the subject level; where the redesign of a course or the design of a new class emerges from. And I think it would help the Faculty to know that there was a robust local system going on between large groups of colleagues or individuals who are then referring to committees within their subject. So a bit more of an indication of how what we're reading actually emerged from the subject grouping itself.* (Participant #4)

In the new state C-CAP's reviewing functionality enables the capture of all feedback delivered to writing teams by members of the Academic Quality Team and members of the Academic Quality Working Group during review [42], [43] (see Figure 5 for process). This aids Academic Committee scrutiny and demonstrates that any academic quality issues have been addressed by writing teams; however, it does not necessarily ensure that there has been departmental or subject group discussion pertaining to the rationale behind the submission of new curricula proposals or the degree to which any new proposal is supported by the wider department or subject group. Participant #4 continued [providing an example of how this aspect of the approval process is opaque]:

> *Sometimes you get that from the rationale... "As a subject group we've been discussing X, Y and Z for a number of years and we have collectively come to the view that we need this particular class..." You are then reassured. But sometimes you don't get that sense at all. You know that it is a real interest of this particular person, who has put forward a proposal because they are going to be teaching it. You don't really get some sense of how it contributes to the welfare of the overall process. […] Just a small historical bit on how this proposal was developed. Who developed it? What level of support does it have at the subject level?* (Participant #4)

Whilst this issue is one that Academic Committee feels has plagued the previous state, it remains something which has been only marginally addressed in the new state, partly because this aspect of the approval process was not one that was identified as needing improvement. The forms served by C-CAP are more prescriptive and elicit greater detail on the rationale behind the proposal. The reviewing functionality and the "audit trail" of feedback delivered to writing teams also aids the transparency of review; but resolving the above noted issue may be one that necessitates new Faculty level procedures to ensure appropriate backing for new curriculum proposals (e.g. support from "X" number of subject group or departmental colleagues). Such a procedure could be facilitated in a future implementation of C-CAP (e.g. the names of supporting academics could be added to a separate section of the proposal, thus enabling Academic Committee to pursue supporting academics for further clarification, if required) but could not be imposed by C-CAP.

The ability to resolve version conflicts and improve the reliability of academic quality review were identified as system features that could significantly aid the efficacy of the approval process (*Version control* [6.5]). Linked to the benefits of version control (discussed in further detail later) was the collaborative drafting potential of C-CAP (*Collaboration* [T:2]). Offering an example of the benefits, Participant #5 stated:

> *That's a big benefit of the C-CAP system. Having... Setting up a writing team, or, y'know, individuals who a contributing to the writing of a course or class, without having that extra burden of somebody who might be proposing sending their work to others for them to add all their bits and pieces. It's very beneficial....* (Participant #5)

However, a preference for adhering to MS Word as the basis for the curriculum design and approval process was also expressed by academic participants. This perspective, articulated by two academic participants, appears to have strong links to previous working practices and their comfort with everyday software applications (*Working practices* [T:4.2]):

> *Call me a Luddite but I like having documents […] If I think about how I would be working on that kind of documentation; if it had just been Word documents - I would have had my various bits and pieces up on the screen and I would be going between them. [With C-CAP] you had to save and then come out, and then go back into the main menu and then find your way back through. And I didn't even have a good sense in my head of how it looked.* (Participant #2)

The preference among academic participants for using MS Word was not merely theoretical but was also observed during C-CAP piloting. C-CAP enables the upload of attachments at specific sections of the class and course forms. Depending on the context, these attachments may contain detailed financial forecasts (which are difficult to model in an online system when faculties use different costing models) or additional academic information not included in the form (e.g. a statement of support from an industry representative that corroborates the academic or business need for a new class or course to be approved). Piloting of C-CAP revealed unexpected system use behaviour whereby certain sections of course and class proposals were left incomplete; instead, the requested curriculum information was contained in a number of separate MS Word attachments, uploaded at various sections of the proposal. The consequence of such system behaviour for the other approval processes C-CAP supports is catastrophic. Important curriculum information or data cannot be captured in a structured manner, thereby compromising subsequent information extraction or reuse and subverting the underlying process. Further discussion of this scenario is therefore warranted.

The habitual use of common MS Office applications to complete everyday work tasks is such that their use in completing new or emerging tasks is often expected. The issues surrounding collaborative working with single-user applications (such as MS Word) has been extensively reviewed in the literature, particularly by researchers focusing on their use within business and organisational contexts, e.g. [44–47]. For example, Adler et al. [45] summarise the problems intrinsic to collaborative working with single user applications, highlighting a lack of collaborative transparency (e.g. understanding the activities of others to avoid neglecting or duplicating work) and version control as particular issues. In their case study of implementing a participatory protocol design system within the health sector, Weng et al. [44] note the inefficient and “error prone” use of MS Word and email in the collaborative design of ethics protocols. Some of these issues were raised in PiP as a result of the baselining exercise [19] and evaluation activity conducted as part of WP7:39 [4] has noted the potential for C-CAP to resolve these particular issues. Weng et al. [44] also explore the change management and “change explanation” issues that arise from persuading users in large organisations to embrace new systems of collaborative working. Whilst better integration of single-user applications is now offered by document management and sharing platforms (e.g. MS SharePoint), the information and data contained within these uploaded documents often lacks structure and therefore evades most types of extraction or computation.

Such a preference for MS Word was highlighted by a minority of the user acceptance testing participants in WP7:37, some of whom perceived the use of any online approval system as supporting the administrative functions of the approval process rather than the design process [5]. In one case an academic participant expressed their intention to actively resist C-CAP were it to be implemented in their faculty such was their attachment to MS Word and the perceived freedom this granted them within the curriculum design and approval process. The attitude that C-CAP is designed simply to aid bureaucratic processes at the expense of academics was also expressed by academic participants during the interviews, for example (*Working practices* [T:4.2] AND *System perceptions* [T:10.1]):

> *I felt frustrated by the fact that I was doing this just to make another part of the process easier…* (Participant #2)

Information systems resistance has been investigated by scholars for decades (see for example: [44], [45], [48–56]) and is often cited as the principal cause of many system implementation failures [50]. System resistance is generally viewed using a series of theoretical perspectives [44], [53], [55], [56]. Kling’s [55] seminal work examining theories of resistance has been distilled by others to include

people-orientated, system-orientated and interaction perspectives [53]. The people-orientated theory suggests that system resistance is provoked by certain internal factors peculiar to the groups or individuals exposed to the system. For example, citing a number of researchers, Jiang et al. [56] note a body of research that appears to support the view that user characteristics (e.g. age, gender, etc.) can influence the acceptance of new systems or technology, as well as the differing backgrounds, values and belief systems held by users. The system-orientated perspective assumes that resistance is created externally by the system or its design and, again, research has noted that resistance increases when users are presented with technically deficient systems [44], [53], [56]. Heuristic evaluation work [14] and further user acceptance testing of C-CAP [5] by PiP was partly to address subsequent user resistance issues [57]. The interaction perspective, however, is almost relativist in its assumptions and attributes the cause of resistance to be within a complex web of factors germane to people and systems and the way in which they both interact. Fundamental to this view is that systems assume different social and political meanings and their consequences are interpreted differently depending on the user's role or position [56]. Markus [53] provides common indicative examples of the interaction perspective in practice, such as:

- Systems that are resisted on the basis that they centralise control over data within organisations that otherwise exemplify decentralised structures.
- Systems that alter the power balance within organisations such that it is resisted by those who lose power.
- Resistance that arises from the interaction between the technical design of a system and the environmental or social circumstances in which it is used.

The attachment some academics appear to have for the continuation of an MS Word/email based system is clearly an issue that should not be overstated; it has emerged as an issue for only a minority of academic participants throughout the entire PiP evaluation programme. It is nevertheless a significant minority and appears to be borne out by the interaction perspective of system resistance, in which the system is perceived to benefit administrators at the expense of academic freedom. This view appears to be corroborated by anecdotal observations of academic quality processes at a number of faculties whereby it was not uncommon for incomplete or substandard curriculum designs to be submitted for faculty consideration. Designs often followed no particular template, omitted key information (e.g. number of student contact hours, resource implications, constructive alignment, etc.), and were left for academic quality teams to "sanitise". Due process was also occasionally subverted at the behest of senior academics.

The design process under the previous state therefore afforded some academics significant freedom in the curriculum design process, and this freedom no longer exists in the new state. C-CAP seeks to standardise curriculum designs and centralise data. It also renders process subversion more difficult; although, as noted above, not impossible. Yet, the perceptions of some participants clearly relate more to people-orientated theories of system resistance; a comfort with familiar working practices with single-user applications (e.g. "If it had just been Word documents, I would have had my various bits and pieces up on the screen"), personal attachment to physical documents (e.g. "Call me a Luddite but I like having documents") or a lack of training or IT literacy (e.g. "I'd like to be able to lift stuff out so that when I create course materials I can easily lift bits and pieces out"). Interestingly, when academic participants were asked which features they would like to see incorporated into C-CAP, it was a spell checker that was cited as more important than the ability to facilitate the process through MS Word.

An important emerging theme from the interviews related to process control (*Process control* [T:5.1]). For members of the Academic Quality Team the new state was considered to have increased the level of control they had when managing academic quality and the approval process, something that was lacking under the previous state owing to the decentralised nature of the design process. C-CAP

was therefore welcomed as a better mechanism for controlling, monitoring, structuring and minimising errors in the process. Participant #5 said:

> *I think the new system will give the Faculty and the Faculty Team greater control and better monitoring of the system. At the moment there are one or two individuals who are dealing with the current system and trying to monitor that, with a high volume of new classes being proposed.... Sometimes there are errors that occur in the current system that I don't think will then appear in C-CAP. I think there will be greater monitoring and control and structure to the process.* (Participant #5)

The increased control given to the Academic Quality Team – something that is reflected in the "star shaped" interpretation of the approval process provided in Figure 5 – was not identified explicitly by academic participants as a source of system resistance, as per the interaction perspective above; their annoyance appears to be directed more at those processes that occur *after* faculty level approval. Perhaps as a result, academics instead perceived C-CAP to provide higher levels of control too and, in some circumstances, found it to be empowering. This also appears to be intimately connected to the underlying transparency made possible through improved process visibility, something that was confirmed by data querying (*Process control* [T:5.1] AND *Transparency* [T:5.3]). Participant #3 said [offering an example of how a lack of control has impacted them in the past]:

> *The biggest change for me is in the past it's usually been the course directors that have quickly fired a module to me saying, "We need to review the course, could you quickly do a new module?" And I've sent stuff in [to Academic Quality and Academic Committee] and they've adapted it or changed it. I haven't seen how that looks and very often, a year later, they've said, "You're running this course!" And when I look at it, they've put the wrong assessment, y'know.... Just small things like that. So, with this, the change for me is that I feel I do have, whatever level I'm in, I can see it, I can go online, I'm part of the team and if I'm not happy and I want to change something I have more control over it.* (Participant #3)

Pareto analyses undertaken in the previous strand of evaluation identified a number of "causes" associated with approval process failures [4]. Whilst many of these "causes" were found to have been resolved by C-CAP, there were others that were problematic to resolve and a recommendation was that interview participants should be consulted to identify potential solutions [4]. Several of the causes existed in areas of the process that C-CAP either had limited influence over or could not control. For example, C-CAP is unable to influence the staff workload constraints that may cause reviewers to delay or abandon the feedback they intend to deliver to writing teams. This was nevertheless highlighted as a topic for discussion during the interviews (Appendix A). The use of C-CAP notifications to better support the timely delivery of review feedback was considered not only as a potential solution to the aforementioned "cause", but was cited strongly by Academic Quality Team members as a feature they would most like to see incorporated into C-CAP in future because it would improve control over the process (*Process control* [T:5.1] AND *System perceptions* [T:10.1]). Participant #5 explained the reasons why:

> *I think it's just very difficult to control external factors like that. […] Sometimes a reviewer of a class can get lost in amongst all the other things they are doing and the role they play within reviewing classes on behalf of the Faculty. Things like reminders, notification, and so on, would be a useful tool that could be used, just to prompt them and make them aware that it needs to be done. We generally give the reviewer a, sort of, generic timeline of two weeks to say "is it possible for you". That's just a sort of bog standard turnaround time; but obviously as you get closer to various meetings throughout the year, you have to then pull that timeline in and instead say, "can you turn this around in a week?". And sometimes it's shorter than that... A couple of days. I think it's when you give them a longer timescale; the review can disappear in amongst their other work responsibilities. Reminder notifications would be a good tool to use.* (Participant #5)

The underlying argument for notifications (or reminders) as a vehicle of process control was that in the previous state it was always possible for Team members to intervene if review feedback was not

forthcoming (e.g. by emailing the reviewer, contacting them by phone, etc.); however, such intervention normally occurred far too late in the approval timeline since Team members were generally only motivated to pursue reviewers when it became clear they were late in delivering their feedback or had failed to adhere to the agreed reviewing schedule. Reminder notifications are therefore sought in this instance to pre-empt delays by ensuring reviewers are reminded of their obligations. An additional reason pertains to the equitable distribution of peer review responsibility across the Faculty. Referring to the previous round of curriculum approvals (*Review of curricula* [T:9]), a member of the Academic Quality Team (Participant #1) noted how quality reviewing was increasingly the responsibility of a small number of academic staff:

> *Our last Academic Committee had something like 57 class proposals going to it. Now unfortunately, [academic's name] ended up with the bulk of them because other people just didn't respond and he was having to ask to get these through quickly...* (Participant #1)

The failure of particular reviewers to complete feedback on time, or to ignore or abandon reviewing because they have failed to prioritise it, has created an untenable situation within the Faculty whereby large numbers of proposals end up being reviewed by a small number of academics. Not only does this scenario unfairly penalise conscientious academics, it raises questions about the academic quality review process since only a minority ever engage with the reviewing that underpins it.

3.3 New state impact: validating qualitative benchmarking analysis

Recall that is was a requirement of this evaluation that additional qualitative data be gathered to validate specific findings from WP7:39, thus better understanding the nature of the business process improvements and changes effected by C-CAP. A qualitative benchmarking approach was used in WP7:39 to establish whether the five principal process and document workflow issues identified in an earlier phase of the PiP project [19] had been addressed as a result of C-CAP implementation. In essence, qualitative benchmarking was intended to assess whether issues prevalent in the "previous state" had been addressed in the "new state" (i.e. C-CAP). A summary of the qualitative benchmarking results from WP7:39 are provided in Table 2.

Process bottlenecks

Qualitative benchmarking found that C-CAP demonstrated an *automational*, *disintermediating*, *tracking* and *intellectual* [58] impact on the curriculum approval process, manifesting itself in a variety of process efficiencies. These efficiencies were consistent with well understood models of IT-supported process innovation [58] and contributed towards an amelioration but not a resolution of the process bottlenecks prevalent under the previous state (Table 2). An inability to effect change in the scheduling of key meeting dates (e.g. academic committee meetings, Senate, Ordinances and Regulations, etc.) meant that despite the process efficiencies only a "partial resolution" of this issue was possible. A number of factors contributed to PiP's inability to resolve process bottlenecks entirely [4], including a lack of project authority to radically redesign approval procedures. This analysis was reflected in the interview data.

Interview data suggested that the timing of these "crunch" meetings remained a significant issue confronting the approval process and it was one that neither PiP nor C-CAP could address (*Process bottlenecks* [T:6.4]). The scheduling of meetings was discussed by all participants as a problem, with some also suggesting that it could only be resolved by radically altering long established University practices. For example:

> *There's a cycle of meetings of Senate, boards of study, faculty academic committees, and with the cycle comes deadlines. And people work to deadlines. What you expect and what you get is a torrent of new class approval forms in the immediate period before a deadline […] If, as [Participant #1] says, Senate treated the whole process as an on-going one and the University itself didn't establish fixed dates by*

> *which these things had to be completed, and there was an on-going process of class and curriculum approval, then it could be treated more or less as routine business by the faculty.* (Participant #4)

Table 2: Summary table of qualitative benchmarking, as originally reported in the strand report for WP7:39 [4]. Includes principal baselining findings [19] ("previous state") against C-CAP implementation and resolutions ("new state") and characterises the process innovation achieved using Davenport's IT process innovation categories [58].

Previous state			*New state*		
#	**Baselining issue**	**Baselining issue summary definition**	**Status of issue under C-CAP**	**C-CAP summary description**	**Impact: Davenport's IT process innovation category**
1	**Process bottlenecks**	Scheduling of meeting dates of key committees resulting in late decisions; primary stakeholders (e.g. library, timetabling, disability services, etc.) informed too late to sufficiently discharge function.	**Partially resolved**	PiP (and ergo C-CAP) unable to change meeting schedules; although C-CAP piloting has facilitated discussion of this by key stakeholders. Nevertheless, C-CAP enables quicker processing of curriculum proposals prior to crucial decision making milestones and ensures communication of curriculum information to primary stakeholders. 'Automational' and 'disintermediating' impacts also improve process efficiency.	Automational Disintermediating Tracking Intellectual
2	**Poor feedback looping**	Poor feedback mechanisms throughout process resulting in inadequate change tracking and poor communication of feedback/changes to key stakeholders, including academics.	**Resolved**	Improved feedback mechanisms throughout the process as facilitated by C-CAP; feedback communicated to key members of academic quality / faculty and members of the writing team.	Automational Disintermediating
3	**Absence of version control**	No version control or unique identifiers in operation resulting in administrative and review issues; lack of standardisation between curriculum design forms.	**Resolved**	Version control and unique identifiers imposed facilitating 'tracking' impact. Curriculum design forms for both class and course standardised.	Tracking
4	**Absence of central repository**	No central repository of approved curricula to function as "single point of truth". Creates issues for reviewers / faculty and periodic review.	**Resolved**	Since C-CAP provides the focus for the entire curriculum design and approval process, it functions as the single point of truth from which the status of proposals can be monitored and approved curricula revisited or amended.	Intellectual Tracking Analytical
5	**Form size and lack of guidance**	Forms considered "daunting and onerous" and obstacle to pedagogical improvement. Lack of guidance associated with curriculum design process resulting in confusion about approval expectations both at academic and review level.	**Partially resolved**†	Curriculum approval forms have been rationalised and "show and hide" approach to interface design enhances accessibility. Guidance on curriculum design and University policies embedded within C-CAP guidance areas.	N/A

But there was also a suggestion by some participants that it was also an issue to which they were resigned and attempting to alter the "mysterious" mechanics of the University's upper echelons was futile (*Process bottlenecks* [T:6.4]):

> *Are we not all guided by Senate back the way - Senate and Court? If they have to approve them then that's what we have to work to!* (Participant #1)

> *There are bottlenecks because there are deadlines that are required to be met, in terms of University processes. I'm not sure there is an awful lot that can be done in relation to that.* (Participant #6)

The current approval process mandates that curricula be "approved" by Senate. As process analysis conducted throughout the lifetime of PiP has discovered, process reality aligns with this stated process insofar has curricula are "approved" by Senate; however, it is worth noting that Senate do not scrutinise curriculum proposals that have already been successfully approved by Ordinances and Regulation (O&R) and ergo by faculties. In effect, new curricula that have successfully passed

† Data from this strand of evaluation activity (WP7:38) confirms the resolution of this baselining issue. See "Form size and lack of guidance".

Faculty and O&R scrutiny are deemed by Senate to be approved and their discussion at Senate is limited to acknowledging their approval.

Poor feedback looping and version control

Issues pertaining to poor feedback looping and version control were found by the qualitative benchmarking analysis to have been resolved [4]. Although these issues were addressed separately in the aforementioned benchmarking analysis, interview participants often connected the two. The findings and discussion of these issues have therefore been conflated.

C-CAP demonstrated improved feedback mechanisms throughout the curriculum approval process. Central management of the approval process and its workflow by faculty academic quality staff enables reviewers at various stages of the process to deliver directed feedback. The feedback mechanisms available in C-CAP broadly emulate the "review comment" functionality available in MS Word, with details of the feedback recorded (e.g. author details, date of feedback delivery, etc.) and remaining visible throughout the approval process so that their implementation can be verified during subsequent review [43], [59]. Since the approval process is governed by workflows and is to a certain extent automational [58], feedback is always communicated to members of the writing team and academic quality / faculty staff. Although all participants recognised C-CAP was an improvement on the previous state, the feedback functionality now available was most valued by those responsible for academic quality, each of whom have responsibility for coordinating the review process (*Poor feedback looping* [T:6.5]). Participant #5 provided indicative comments and noted the simplicity of the process for reviewers:

> *When the proposal goes to a reviewer, it's pretty much they can look at the form and then incorporate their feedback straight into that form, rather than having to complete a separate form, as it currently is in the process at the moment. So they can basically read what is written by the proposer and then underneath they can incorporate their feedback straight into the section underneath, and I think that's a lot easier for the person who is reviewing that class or course.* (Participant #5)

An interesting and additional insight was the importance of improved feedback mechanisms in supporting academic quality. Something which was corroborated by further data interogation (*Academic quality* [T:1] AND *Version control* [T:6.5]). For example, another participant involved in academic quality highlighted the chronic information management problems that arose in the previous state – including the associated version control problems highlighted in WP7:39 [4] - and how it often compromised quality assurance processes:

> *I mean, I think from our point of view, what we would like - which is what we tried to do with class proposals and scrutiny - was to have at least two people looking at each class proposal and then putting... But in a practical sense it just didn't work out because if they sent something back with track changes and then somebody else hadn't... How then do you....? That [feedback] superseded that.... It was just getting into a mess and reviewing ended up being just one person, really. And I don't think quality wise that's very good, y'know?* (Participant #1)

Since C-CAP provides central management of the approval process and "a single point of truth", only the most up-to-date versions of curricula are visible to all stakeholders and no version conflicts can arise. Review comments are added to proposals within C-CAP and any additional review comments provided by reviewers are made visible. The status and tracking of proposals is monitored by C-CAP and is made visible to all, thus improving process transparency to stakeholders. The disparate curriculum approval forms that were found to exist across the institution have been conflated into a "super" form which standardises curriculum design and incorporates features designed to improve curriculum design and subsequent pedagogy. In fact, this latter point (i.e. use of standardised forms) was considered by three participants to be further evidence that version control - at a fundamental level – had been resolved (*Version control* [T:6.5]). Participant #5 characterised the difficulties this issue created in the previous state and how C-CAP had changed it:

> *Yeah, some Schools seem to be using historical versions of module descriptor templates, and things like that; whereas we want them to use a specific template that we've created for our team and the current process. So I think C-CAP will eliminate all of those aspects... People using different templates for different things, whereby, y'know, somebody writes a class on a totally different form, it then goes to someone to review who then questions why they are using the incorrect template. C-CAP will eliminate that because everything is online, it's the same template, they can't use anything else.* (Participant #5)

The qualitative benchmarking analysis found C-CAP's feedback mechanisms to promote an efficient level of disintermediation [58], with the delivery of feedback to relevant stakeholders avoiding human intermediaries. However, an interview participant (#6) who was involved in the Academic Committee review process (during C-CAP piloting) expressed concerns about how the system had been used at Academic Committee level:

> *We gave them [our feedback] to the person who was clerking the meeting. He took them [review feedback] to put them in afterwards. I mean, for me, it would have been a much more engaging process if we had actually been able to do the changes as we went, and the course and approval body could have engaged in a joint enterprise. All we did was the same as we always did; only we did it on a computer screen - so it didn't add value […] it wasn't an interactive process.* (Participant #6)

Further clarification from Participant #6 indicated that C-CAP had been used at the Academic Committee meeting in a manner that had not been anticipated by PiP. The meeting to which Participant #6 referred was minuted by a member of the Academic Quality Team. Curricula under review by the Committee were displayed on a projection screen, directly from C-CAP. However, rather than inputting review comments on C-CAP as and when the Committee agreed the feedback, comments were instead minuted separately and inputted at a later date by a member of Academic Quality staff. In essence, C-CAP was used more as a source of the curriculum information rather than as a mechanism for facilitating the review process. Whilst this incident marks a disappointing use of C-CAP during the HaSS piloting, it at least highlights the fact that the best use of a new technology may not always be obvious to those using it. The need for "C-CAP best practice" documentation or training to better assist those responsible for the administrative management of the curriculum approval process is therefore an important requirement for future embedding of the system. Such training is particularly applicable to academic quality staff, whose position at the centre of the star-shaped approval process is indicative of their role as key change agents. Maximising the effectiveness and impact of C-CAP during "real world" use is also integral to reducing system resistance and promoting acceptance.

Absence of a central repository of curriculum designs

C-CAP provides the focus for the entire curriculum design and approval process in the new state. It functions as the single point of truth for the most up-to-date curriculum information, from which the status of proposals can be monitored and approved curricula revisited or amended. Central management of the approval process – and the central repository of curriculum information it creates – facilitates version control and proposal tracking. As well as 'tracking', the central repository also demonstrates intellectual impact [58]. This is characterised by capturing intellectual or knowledge assets that can then be distributed more widely for reuse or to inform the activities of other groups [50]. For example, curriculum designs demonstrating innovative assessment approaches could be re-used (e.g. as a template) by another academics during the early stages of their curriculum design process.

Curricula are now being captured, managed and distributed by a central system, providing a consistent source of knowledge that can be accessed by anyone with the intellectual desire to do so. Although a fully populated central repository is not yet available from C-CAP, all group interview participants agreed on the potential of C-CAP to deliver one and its ability to resolve the issues identified in the previous state (when fully populated) (*Central repository* [T:6.1]). This was also corroborated by data in the individual interviews. However, within this broad area of discussion and

its associated node (*Central repository* [T:6.1]), it was the potential of the central repository to be a source of "knowledge assets" which was considered by participants to be the most beneficial aspect. Such a repository of knowledge assets and their curation was considered to support the following activities:

1. Access to a broad range of curriculum designs to inform the development of new classes and/or courses by other academics and to support professional teaching practice.
2. Dissemination of all curriculum designs to improve transparency and move to a system that captures explicit and tacit curriculum design practice.
3. A "shared intelligence" about the quality of existing curricula and would set a tangible curriculum design and quality benchmark, e.g. access to the design of exemplar classes and courses against which new curricula could be compared.
4. The re-use of curriculum knowledge assets to contribute towards institutional competitive advantage.

Participants #2 and #6 provided cogent explanations of the rationale behind managing curriculum designs to inform colleagues and to make explicit widespread "practice wisdom":

> *I think the benefits of having something central are enormous because, at the moment, there is such a lack of consistency, people keep documents in their own wee rooms; you don't know where to go to see what a course document looks like unless someone happens to have it and they send it to you…* (Participant #2)

> *I think it would be really helpful [to have access to curriculum designs]. As I say, the passing on of "practice wisdom" from one person to the other is not particularly scientific, and it's obviously subjective. For anyone who is thinking about designing a new course, to be able to go and look at a range of different approaches, or different kinds of course, and to get some kind of... Not a rigid template, but ideas about how you might put a course together, I think would be helpful because it's not something that, it seems to me, the University offers. I'm not conscious of ever having gone on a course about curriculum design, for example. So I think it would be helpful if there was a place you could go to.* (Participant #6)

This need to facilitate access to exemplar designs was not always linked to improving the academic or pedagogical rigour of proposed curricula, or exposing explicit or tacit curriculum design practices; rather, several participants also noted its potential for helping academics capture the necessary evidence to better "pitch" the business case required for their new curricula. In essence, it would assist academics in making their course "pitch". As in the wider HE sector, the University is adapting to changing economic circumstances and the increasing marketization of the HE sector by mandating a clear business case from the authors of new curricula, prior to the submission of a full course proposal. This business case must be accompanied by appropriate evidence (e.g. evidence of market appeal, an analysis of how the proposed course fits within the University's or Faculty's wider academic portfolio, etc.). Whilst academic matters remain of paramount importance to the curriculum approval process, the new emphasis on the financial and business implications of curricula is something which the academic participants found disorientating. The ability to access exemplar course proposals that not only demonstrate how best to encapsulate the business case but reveal excellence in a number of areas (e.g. academic content, marketing strategy of course, etc.) was therefore identified as instrumental to ensuring that new University expectations were met. Participant #3 articulated their need as follows:

> *For a new course, or a new area, or also maybe courses that have been quite successful - how did they capture the evidence for it [in the business case]? Or their marketing? It would be quite useful to see the different ways people have done that. Because, y'know, it's probably not something that we have great experience of.* (Participant #3)

The above activities all relate to the wider activity of knowledge management (KM) [60]; harnessing existing intellectual capital to support other organisational activities, whether this is to support the professional development of academics, make explicit curriculum design practices or aid quality assurance, as the examples above suggest. It is even interesting to note that the vocabulary some participants used reflected a cognisance of knowledge management principles, for example:

> *That [central repository of curriculum designs] would link to what I think are the most positive aspects, which is the transparency and the ability […] for us to get more of a shared intelligence about what's out there [within the University's curriculum portfolio]* (Participant #2)

Whilst many UK HE institutions are engaging in KM activities and recognise the importance of KM in improving competitive advantage [61], [62], it remains a relatively new development within the education sector and the overall institutional impact of KM activities is often limited by poor adherence to appropriate or coherent KM strategies [63]. Such limited success at HE has also been attributed to, among other things, the characteristics of academic staff, the academic culture, and the management structure and styles that tend to prevail in universities, all of which can stifle KM innovation [63], [64]; although it should be noted that this scenario is by no means peculiar to the UK, e.g. [65], [66]. As creators of knowledge, the silo-based approach to KM activity has often tended to prioritise the curation of research outputs and large-scale IT initiatives which do not necessarily facilitate KM [63], let alone the management of curriculum information and data. There is greater recognition that UK institutions need to improve their ability to capture explicit and tacit knowledge, particularly within the area of curriculum design [67]. Some overseas institutions have already taken steps to include curriculum design within their wider KM strategies and activities, such is its importance [68], [69]. Wright [67] notes some of the typical approaches to managing explicit knowledge, such as creating repositories for assessments, interdisciplinary learning and curriculum improvements. C-CAP's creation of a repository, whilst helping to resolve the issues identified in the baselining exercise [4], therefore appears to be a positive contribution to better capturing, managing and sharing the University's collective curriculum knowledge.

Form size and lack of guidance

C-CAP serves standardised curriculum design and approval forms and, where possible, has rationalised existing forms or taken advantage of the technical platform to deliver system logic such that features of the curriculum design process are hidden to members of the writing team unless specific options are selected, or their curriculum design context demands it. This logic ensures that those form elements rarely used in curriculum design remain hidden to writing teams unless they are explicitly required, thus reducing form length and suppressing irrelevant elements of the form. Improved guidance has been embedded within C-CAP, providing additional guidance on University policies (where they are available) and recommended best practice. This has been supplemented by extensive C-CAP training materials (including videos) which have been made available via the University's Development and Training Gateway (see Figure 3). Despite the aforementioned improvements to form size and lack of guidance, the qualitative benchmarking analysis concluded that this issue had only been "partially resolved" since verifying whether the new forms were "less daunting and onerous" – and whether the guidance was an improvement - was a qualitative matter to be verified via piloting [4].

Qualitative data captured from the group and individual interviews appears to suggest that the issues surrounding form size and guidance have been largely resolved (*Form size and guidance* [T:6.2]), with the reduction in "paperwork" considered most beneficial. For example, some participants referred to the huge amounts of superfluous documentation that were often submitted in the previous state and how these were greatly reduced within C-CAP (*Form size and guidance* [T:6.2] AND *Paperwork* [T:4.1]). Participant #4 said [highlighting the need for curriculum approval information that better facilitated academic scrutiny and approval]:

> *I felt less exhausted having read it all than I have in the past. Having been presented with two or three hundred pages worth of stuff, only twenty or thirty of which were really crucial [to the approval process]. So, no, I thought it was much more streamlined.* (Participant #4)

It is also noteworthy that the principal cause of course approval delay or rejection - identified as a result of Pareto analysis in previous evaluation activity - was the volume of proposals to be reviewed and their excessive size, such that expeditious reviewing within the required timeframes was increasingly difficult for staff to manage (see [4] for further details). Further validation that this particular Pareto "cause" (course cause #1) has been resolved is therefore extremely positive. Assuming cause proportions from the HaSS Pareto analysis remain constant, in excess of 40% of future course proposals (as submitted via C-CAP) can be expected to avoid delays or rejections attributable to this particular cause.

Paring back the curriculum information requirements to that which is essential for facilitating academic quality assurance and resource planning was also highlighted as a positive change in the new state. Like Participant #4, Participant #5 noted the reduction in unnecessary bureaucracy while also noting C-CAP's focus on academic quality and meeting University approval requirements (Academic quality [T:1] AND *Paperwork* [T:4.1]):

> *I think C-CAP minimises the amount of documentation that was required previously by the Faculty. For some courses you are looking at a document that's maybe 150-200 pages long, with all the appendices and everything else attached. So I think C-CAP minimises that without losing the overall quality assurance processes that are required for the approval of a course. The academic staff that I have spoken to - and the previous review that I was part of for C-CAP - they felt that it minimised the amount of work they had contribute towards introducing a new course.* (Participant #5)

The problems associated with collecting unnecessary curriculum approval information were noted in previous PiP work [19] and were once again highlighted in the group interview, with a member of the Academic Quality Team commenting on the absurdity of this scenario:

> *I think what was happening in Education was much more rigorous. Even the University documentation... The folder I got, I thought "Oh my god!" There was much more detail required than what the University process [demanded], and I think, "Why is that? What's wrong that the University thinks that's enough documentation, but you are [asking] for all of this other stuff?"* (Participant #1)

The University policy [70] provides little prescriptive guidance on the information needed to facilitate curriculum approval, mandating only key pieces of curriculum information. This policy vacuum has, over time, motivated faculties to create additional information requirements in order to fulfil perceived local or discipline specific needs; yet, as noted above by Participant #1, #4 and #5 (who are members of Academic Committee and the Academic Quality Team), such additional information remains superfluous and is rarely scrutinised nor is germane to the curriculum approval process.

Whilst C-CAP has greatly reduced the information requirements involved in curriculum approval, it has not dispensed with those germane to curriculum design. In some areas C-CAP has instantiated a minimum level of curriculum design quality and in others it requires greater specificity in curriculum designs. The comments of Participant #5 continue below and characterise some of the issues originally reported in the baselining exercise, e.g. curriculum proposals lacking sufficient detail on the educational design to allow committees or reviewers to make an informed assessment of academic quality or its alignment with institutional or faculty priorities [19]. This was also identified as a significant cause of class approval delays/rejections in previous Pareto analyses [4] and particularly affected those proposals containing insufficient detail on intended assessment techniques or strategies. Participant #5's comments also provide a good example of C-CAP's positive impact on the class design and quality assurance process, and its reduction of unnecessary approval documentation:

> *I think the detail in C-CAP is way beyond what we would normally expect from somebody reviewing, or proposing a class. There could be on occasion, erm, somebody would just put down, erm, a 2,000 word assignment. And obviously that's not enough information! We need a break down of different tutorials, seminars, and things that they are doing in the delivery of the class; any summative and formative assessment. But C-CAP goes into greater depth than that and breaks it down even further. […] That's one of the big advancements, in terms of looking at assessment - which is obviously a huge priority for the Faculty.* (Participant #5)

Prior to C-CAP those staff designing modules reported a lack of guidance accompanying the large and "daunting" curriculum design templates they were required to complete. Guidance that was available was often scattered across numerous sources and tended to concentrate on the bureaucratic requirements of the curriculum approval process. The qualitative benchmarking analysis found C-CAP to deliver improved guidance for users and this was corroborated by interview participants (*Form size and guidance* [T:6.2]). Comments from the following interview participants were indicative:

> *The guidance is now not in a whole number of different versions, but there is an asset of guidance and you should be able to look that up.* (Participant #1)

> *The guidance notes I think are very useful; the sort of help areas, if you're struggling and you're not entirely sure what this requires. It's systematic in its approach. It makes sense from the starting point to the end point when writing a new class or course.* (Participant #5)

Context sensitive guidance has been embedded within C-CAP [71], providing additional information on University policies (where it is available) and recommendations for best practice. Detailed training materials for C-CAP and its operation (including tutorials and videos) have also been developed. These are now delivered via the University's Development and Training Gateway and are linked to from C-CAP. Whilst participants commented favourably on C-CAP's context sensitive guidance, some concerns were raised about the comprehensiveness of its guidance and its ability to help users overcome specific difficulties. Providing one such example of this, Participant #3 reported the following issue:

> *Part of our course is being delivered with someone who works at [institution name]. So I put in 50% delivered by an outside institution... And it [C-CAP] came up and said, "Collaboration agreement required". Now, there was no.... You couldn't click on that to find out how you obtain a collaboration agreement; I don't really know what that is. Just some fine tuning like that so that you're not spending ages phoning up trying to find out what is this, etc. Similarly, with the learning outcomes, I had to phone [another member of staff]... Where do I find..? Y'know, because there's different ones for different types of course. I just thought there could have been links within the guidance... If we do have official things that set the background to this, or are standards, or are things that are required by the University... When you're filling it in the links.... Just even so that you check that you're in tune with it.* (Participant #3)

Where such guidance does not exist in C-CAP it is normally because the University has not documented the policy. For example, Figure 7 (below) provides an example of the context sensitive guidance provided in Section 1.1 of the class approval form. Links to further information and guidance are provided; but it is acknowledged that there are aspects of University policy which remain mysterious and undocumented. Guidance on "collaboration agreements" is one such aspect. During the C-CAP development phase, investigation by PiP project staff failed to locate definitive University policies in a number of areas. In the case of collaboration agreements, no policy is available on the University website neither have enquiries to relevant departments been able to uncover tacit practice. A number of policy "grey areas" exist and this, in turn, has been reflected in C-CAP's context sensitive guidance. Participant #3's concerns, whilst wholly legitimate, are therefore disappointing and reflect the wider failings of an approval process that lacks specificity in particular areas.

1.1. Core Information View Guidance

(Lead) Faculty: The faculty that will assume overall responsibility for the proposed class and incorporates the lead department (below).

(Lead) Department: The specific department that will lead the proposed class, assume responsibility of its delivery and on-going management. If the proposed class is to be shared with another University of Strathclyde department, please add the necessary details.

Dummy class code: A dummy class code is optional and can be assigned to proposed classes for internal departmental or faculty purposes. For example, some curriculum designers like to assign dummy class codes to assist in identifying classes during the drafting and/or approval process, or to associate them with a particular degree course. *Note that dummy class codes are only temporary and will be replaced by an official class code after approval.*

Class title: The intended title of the proposed class.

Credit value: The introduction of a Standard Credit Framework underpins the delivery of the University's strategic vision in relation to the student experience, to learning, teaching and assessment approaches, and the development of interdisciplinary opportunities for learning and teaching. In 2009-2010, the revised first year curriculum based around the 20 Credit Framework was implemented for all undergraduate courses. An iterative process will be used to phase in the subsequent years of programmes.

- 20 credits is the standard credit block for undergraduate and integrated masters' classes.
- Standard credit year of 120 credits.

Further detail on the details of the credit framework at the University of Strathclyde is available from Annex 1 of the University Procedure and Guidelines Course and Class Approval.

Further information on the rationale for the credit framework at the University of Strathclyde is available from the Curriculum Renewal page.

SCQF Level: Level refers to the academic level to which the proposed class corresponds. The University of Strathclyde now adheres to the Scottish Credit and Qualifications Framework (SCQF), which in turn aligns with the European Qualifications Framework (EQF). For most degree courses the levels in SCQF correspond to the year of academic study, with undergraduate degree courses beginning at Level 7. The SCQF levels and how they equate to the previous University system are listed below:

- **Level 7** = Level 1, undergraduate
- **Level 8** = Level 2, undergraduate
- **Level 9** = Level 3, undergraduate
- **Level 10** = Level 4, undergraduate
- **Level 11** = Level 5, integrated masters degree / masters degree / post graduate certificate or diploma
- **Level 12** = Doctoral degree

An interactive SCQF diagram is available for further information.

Normal duration of class: Please indicate if your proposed class is to be delivered during semesters 1 or 2, or both.

Mode of attendance: This refers to the manner in which the class is expected to be delivered to students. "Attending" is a class that demands students to be on campus to participate meaningfully. "Distance" is a class which is intended to be delivered remotely as a part of distance education or online course. "Open" is normally a free-standing credit bearing class which is not normally part of a wider academic degree course. Such open classes are often delivered as part of a series of other open classes through departments such as the Centre for Lifelong Learning.

(Lead) Faculty: Humanities and Social Sciences (HaSS)

Figure 8: Context sensitive guidance in C-CAP for Section 1.1 (Core information).

3.4 Interviews: "Three orbs model"

Evaluation activity conducted during the user acceptance testing of C-CAP found academic participants' to be favourably disposed to the C-CAP *system*. However, the perception of the existing curriculum design and approval *process* (i.e. previous state) was generally quite negative [5]. Data suggested that few were satisfied with the status quo, tacitly acknowledging that adjustments and improvements were justified. More specifically, participants were inclined to view the current process as onerous and stifling class/course design, and in need of improvement to render it more efficient and responsive to the changing demands of industry and the employment market. All of the aforementioned suggested that academics would be receptive to any online system developed to ameliorate these process issues; however, the findings were that academics were sceptical of the underlying process irrespective of the system that was delivering it, and were similarly sceptical of greater specificity in the curriculum design forms served by C-CAP. The pressures of increased teaching loads and departmental research expectations were cited as contributory factors feeding this scepticism, as were strongly held views on academic freedom within HE teaching contexts [5]. A dichotomous picture therefore emerged from the user acceptance testing, exposing two opposing perspectives: *system* versus *process*.

The "three orbs model" (Figure 9) was proposed to better understand the conflicting information needs at the centre of the process and suggests that there are in fact three conflicting "information needs" within the process perspective [18]. These information needs could be described as three divergent sub-perspectives, all existing as part of an information ecosystem and all underpinning the wider process perspective.

The model is characterised by three divergent information needs, each associated with the curriculum approval process and each pulling away from each other (Figure 9). As these divergent needs pull away from each other the tolerance levels of the academic actor situated at the centre of the model becomes stretched as they attempt to satisfy these disparate information needs. Satisfying these needs is nevertheless required to facilitate the curriculum approval process. All the needs form part of a curricula information ecosystem. A successful framework for curriculum design and approval is therefore one that can square these divergent needs and ergo deliver a system and an underlying process that lies within actors' overall tolerance levels. Failure to achieve equilibrium (i.e. an imbalance in the information ecosystem) may foster the development of ill-conceived curricula (perhaps resulting in delays to approval) and may lead to cynicism about the overall process as academics' tolerance levels are stretched.

Figure 9: "Three orbs model", characterising the three conflicting information needs at the centre of the approval process. Originally proposed in [18].

The three divergent information needs inhabiting the curricula information ecosystem are as follows:

- The top orb denotes the *Academic* information need. This orb represents academics' need to design the substantive intellectual content of curricula such that it reflects current discipline specific trends or requirements, the demands of industry, employers, professional bodies, etc. This would include important aspects of the pedagogy such as aims, learning outcomes, proposed learning activities, and assessments. Such information is obviously important for satisfying the requirements of academic quality committees within University faculties.
- The *Operational* information need represents the essential operational information required to facilitate the approval and delivery of curricula, i.e. resource and planning information. This would include information pertaining to the business case for the new curricula, how it complements existing curricula and supports the faculty teaching portfolio, recruitment potential, resource requirements (e.g. teaching space, technology, staffing, etc.), etc. This information tends to satisfy the need to resource and plan curriculum delivery and, in some cases, is considered separately by faculties.

- *Aspirational* information needs can seem esoteric to academics but they represent an important goal for those Universities wishing to compete in a globalised HE environment [10]. Such aspirational information is normally requested from the centre to assist institutions in effecting improvements in pedagogy, operational efficiency and ultimately the student experience. Student Experience and Enhancement Services Directorate (SEES) [72] is the body within the University of Strathclyde responsible for monitoring, governing and improving academic quality, learning technology enhancement, educational strategy, and so forth. This can include information on the extent to which academics will adhere to University policies on assessment and feedback, greater specificity in assessments and their alignment with learning outcomes, detail on how curricula will be evaluated, etc.

The aim for PiP is therefore to foster a system that supports the balancing of these divergent information needs and the process that underpins them.

Recall that an objective of this evaluation was to explore the accuracy of the "three orbs model" [18]. Analysis of the qualitative data gathered from the interviews indicates varied opinion on whether the model reflects academic reality. Interestingly, the views of academic participants tended to be contrary to those held by academics involved in the user acceptance testing (WP7:37). All academics in the interviews recognised that there was a need to gather the above noted information and for its quality to be improved (*Three orbs* [T:11], including other relevant nodes). For example, Participant #6 suggested that meeting these divergent information needs was a moral necessity and that the issue of "stretched tolerance levels" was more to do with how information gathering was administered:

> *I'm not sure, because I do think we have a duty, a responsibility to be accountable for what we teach. Students have a right to know what it is they are going to be taught on any given course and also how they are going to be taught. I suppose it's not so much that I think there's an overload of information demanded of us but sometimes you're required to give that same information in a number of different arenas. And that's not helpful.* (Participant #6)

The ability to reduce duplication and to better reuse and harness curriculum information was therefore a recognised benefit of C-CAP in the new state, i.e. better administering the divergent information needs. Participant #5 cited examples of how C-CAP was contributing to improvements in the way information gathering was administered:

> *As an example of that I think C-CAP has... you've developed the Class Code Allocation Form, which is a simple example of something... an extra task they have to do, or somebody within the School has to do it on behalf of the academic, in order to have that code created. With C-CAP, being able to create that form rather than an individual filling that form in... the 15-20 minutes out of their day to actually populate that form and send it off, will improve things - and anything C-CAP can do along those lines, to cut down the amount of forms and paperwork they have to create will be beneficial for them.* (Participant #5)

Some participants even felt there was scope to increase the amount of information being collected. Participant #2 said [providing an example from their recent piloting of C-CAP]:

> *And in some ways I felt we got off lightly in terms of what we had to produce for the documentation, about those kinds of processes.* (Participant #2)

Despite the unanimous opinion among academics about the legitimacy of the divergent information needs, there was an underlying – albeit isolated - concern expressed about the breadth and nature of information requested, particularly in areas relating to resourcing. This concern appeared to confirm the tolerance levels characterised by the three orbs model. Referring specifically to the course design and approval process, which is far more detailed and lengthy, Participant #2 provided an almost contradictory comment to the one provided above:

> *I absolutely feel that the messages we're being given… the rhetoric is that we attend to academic work and that the new structures are more about ensuring that we divide our various expertise, so that administrators do what they do administratively, we do what we do academically, finance people do what they do… whatever their area of expertise is. I feel increasingly that as an academic I am expected to be an expert on all of these things, and that I'm taken to task over not knowing about quality assurance, financing, what a RAM charge is, and... And I don't know all of these things. Maybe I should want to, but actually I don't feel I have the capacity in my head, let alone in my day, to know these things.* (Participant #2)

Through their experiences managing the curriculum approval process, participants involved in academic quality appeared to recognise the "three orbs model". Participant #5 suggested the issue was down to academics' lack of understanding about the approval process:

> *They [academics] feel that "Oh, I'm going to create a new class", and they think it's a simple process - but it really isn't that simple! They have to take into account the amount of information they have to supply to, obviously, the Faculty and different areas, to get that approved. […] You do get a lot of academic staff, erm, what's the word… venting their feelings about the process; but they have to meet specific targets in order to have that approved. And I think, if they have a greater understanding of what they have to do, it would be a lot easier for them.* (Participant #5)

It would therefore appear that the "three orbs model" stimulated a series of conflicting views, which from one perspective validate the model but from the other refute it. Academics supported the collection of "academic", "operational" and "aspirational" information as part of the curriculum approval process and considered its collection in a positive light. The model was validated insofar as participants recognised these divergent information needs of the approval process, the need to gather "better information" and the potential this had to overload academics; but this overload was not considered to emanate from the information requested and was rather attributed to the poor mechanisms used to collect it, the high level of duplication and the "needless" repackaging of existing information that was perceived to exist in the previous state. C-CAP's ability to improve information capture and reduce duplication was acknowledged, suggesting that C-CAP has demonstrated a positive impact in both meeting the three divergent information needs illustrated in the model and improving the way this information is captured and reused in the approval process, thus reducing information burden placed on academics. Whilst this is clearly a positive finding, it should nevertheless be remembered that this phase of evaluation was conducted within a single University faculty (HaSS). Academics' fervour for increased specificity in curriculum design may not therefore be shared elsewhere, particularly when previous evaluation activity involving participants from other faculties suggested otherwise [5]. It would also appear that members of the Academic Quality Team are not unacquainted with HaSS academics' discomfort with the curriculum information requirements, suggesting that not all HaSS academics share the positive opinion expressed above, despite the unanimity with which it was held during data collection in this instance.

3.5 Most Significant Change (MSC)

Recall that MSC stories were collected from stakeholder participants towards the end of the C-CAP piloting period, with the curriculum design and approval process constituting the "domain of change". These stories highlighted the following significant changes for participants:

- Removing the administrative burden for those academics engaging with the curriculum design and approval
- Enabling process transparency and visibility
- Enabling better control over the design and approval process
- A new "shared intelligence" of curriculum design at the University

It is noteworthy that these changes align with many of those already discussed by participants during the interviews, but also identified as a result of the analysis of C-CAP business process impact [4].

The most detailed story – and the one selected to highlight the significance of C-CAP's impact – was provided by a member of the HaSS Academic Quality Team. This story is reproduced in Table 3 (below) and was unique in that it conflated a number of significant changes relevant to the management of academic quality within the HaSS Faculty. These changes not only included improved control and monitoring of the approval and academic quality process (as listed above in other stories) but included a series of unintended changes pertaining to improved staff understanding and knowledge, as well as motivating the creation of new team mechanisms for providing advice to staff.

It is perhaps unsurprising that a member of the Academic Quality Team provided the richest MSC story. Owing to their star-shaped mediation of the process underpinning C-CAP they - more than any other stakeholders - were exposed to most of the system's functionality, as well as functionality denied via permissions to other stakeholders. They also enjoyed sustained exposure to the system thus potentially making their generation of richer MSC stories easier.

Table 3: Selected Most Significant Change (MSC) story, using Davies and Dart's story report format.

Title of story	Greater control and improved knowledge and understanding
Name of person recording story /OR/ Job role	[HaSS Academic Quality Team member], HaSS
Date of writing	16.04.2012
Who/what was involved?	AQST Staff
When did it happen?	Since C-CAP was introduced to HaSS
What happened? The C-CAP system in its entirety has given greater control to the Faculty staff in the Academic Quality Support Team (AQST), in improving the co-ordination of the overall process. This does present some challenges for AQST colleagues in the future but will allow them to develop a greater depth in knowledge and understanding of the processes involved. The previous system used for course approval/review only allowed AQST staff in the Faculty to be distributors of information on the approval/review process by providing a set of guidelines for staff to utilise for the whole process. The new system has meant that colleagues in AQST have to understand the nuances of course approval/review and be able to interpret the information required to assist academic staff in completing the online form. A greater number of meetings have been held with the academic staff involved in creating their online course proposals which means AQST staff now provide a greater support mechanism as well as providing advice to academic staff on who to contact about specialist information required in the online form. This level of support has never been apparent in the previous system. Staff in AQST will ultimately feel more valued by academic staff proposing the courses and AQST staff will be able to develop a specialist knowledge which can be used across other areas of work within the Faculty. The new C-CAP system also allows greater monitoring and control of the course approval procedural process by Faculty AQST staff to ensure 'every box is ticked' and that the process is as smooth as possible for all concerned in order to get the course approved.	
And why was it significant to you? This change means there is a greater onus on Faculty AQST staff to comprehend the complexities of the process to allow academic staff to complete the online form successfully. More comprehensive support is provided to academic staff through meetings about the new system as well as being required to network with other staff in the Faculty/University to assist with matters relating to international recruitment, alumni relations, professional accreditation, finance, resources, marketing and communication. This wide-ranging involvement for AQST Faculty staff means a greater time commitment. But being able to make links and connect knowledge developed in areas of the course approval process means the Faculty and University will benefit in the long-term.	

Unfortunately, MSC story collection from of other participants was less successful than originally anticipated and the reflection in the stories did not meet expectations. Several participants clearly experienced difficulties identifying appropriate or "significant" stories and some of their stories consequently lacked detail or depth. One participant also preferred not to provide a story at all (see Section 2.3 for details). The difficulties in capturing MSC stories have been investigated by Willetts

and Crawford [39]. While reflecting on the success of MSC and its deployment in a traditional MSC data collection scenario (i.e international development work), Willetts and Crawford [39] concluded that MSC stories can be difficult for participants to articulate, primarily owing to the higher-order skills that are required to provide a "good" story (e.g. the reflective skills). They also note the problems participants have in deciding which stories are "significant" and worthy of reporting. Both of these aforementioned limitations were expressed informally by most participants as reasons why they were dissatisfied with the stories they submitted. Some attributed their dissatisfaction to the length of time spent piloting C-CAP and their limited experience of using the system for sustained periods of time. Therefore an additional explanation for the disappointing quality of MSC stories may relate to the limited time that was set aside for Faculty piloting and the relatively small number of participants involved in the piloting. For example, in their MSC guide, Davies and Dart [34] recommend extended periods of story collection. Such periods are recommended to span a year, during which stories might be collected every three months. A shorter but more intensive period of story collection in this instance was predicated upon the assumption that more faculties would agree to participate in the piloting and would also agree to pilot earlier in 2012. The limited scope of the piloting was therefore attributable to the low administrative capacity of other faculties (see Section 2.2). Indeed, the original PiP Evaluation Plan [13] anticipated that several faculties would pilot C-CAP for a period in excess of three months. So whilst all key process stakeholders were involved in piloting C-CAP and generating the subsequent MSC stories, the quality of the stories in this instance may have been better had the period of piloting been longer, thus exposing all users (not just members of the Academic Quality Team) to the system for extended periods of time and better enabling them to recognise significant changes over time. Additionally, had more faculties participated in the piloting more MSC stories would have been generated, from which the selection of a "winner" may have been considered more satisfactory.

The aforementioned discussion therefore highlights the potential limitations of the MSC approach when attempting to capture stories that are universally reflective; but it also notes the clear dependencies that exist if its use is to be more successful in this or similar evaluative contexts. It is, nevertheless, worth noting that the MSC approach was moderately successful in this instance, generating numerous stories that, not only clearly indicated (as noted above) the principal areas of professional practice that participants considered to have changed significantly as a result of C-CAP's introduction, but corroborated the human aspects of C-CAP's impact on process efficacy as identified in the evaluation of business process impact (WP7:39) [4]. Deployment of MSC for the present evaluation has also informed the monitoring mechanisms to be used for the institutional embedding of C-CAP, of which MSC will be one.

4. Conclusions

Sections 1.1 and 2.1 have summarised the PiP rationale underpinning the institutional need to effect improvements in curriculum design and approval process responsiveness. Central to achieving this is the development of innovative technology-supported approaches to curriculum design, approval and review. It is anticipated that the improvements effected in process efficacy as a result of adopting innovative technology-supported techniques can better assist HE institutions in reviewing or updating curriculum designs to enhance pedagogy or maintain academic quality, as well as making institutions more responsive to the demands of a rapidly changing and globalised HE context. Whilst some previous evaluation activity [4] was largely concerned with evaluating the extent to which C-CAP effected process efficacy and resolved acknowledged approval process deficiencies, this present strand of activity was designed to better understand the impact of C-CAP within specific stakeholder groups (Section 2.1). Its purpose was to understand the extent to which C-CAP is considered to support curriculum design and, more specifically, the approval process. This included numerous objectives but was principally concerned with achieving a better understanding of the changes, efficiencies and improvements that different stakeholder groups considered to have been effected under the new state. Validation and triangulation of previous evaluative findings was also an objective, encompassing the capture of qualitative data to complete Kettinger et al.'s [15] process impact assessment (as initiated in WP7:39) and validation of the "three orbs model" [18].

Analyses of interview data found participants to support many of the findings from previous evaluative strands, e.g. [4], [5]. System perceptions were generally positive, with the simplicity of the drafting process within C-CAP and its potential to minimise common process misunderstandings cited as particular benefits. Forms are now more prescriptive and clarify the curriculum information expectations of writing teams, thereby helping to improve the specificity and ergo the quality of curricula. Issues surrounding a lack of process visibility or transparency were considered to have improved because C-CAP not only supported curriculum design by providing greater prescription in terms of the information expected in curriculum designs but also because it made transparent the various approval process milestones. Improved transparency was therefore a clear change that was effected by C-CAP; although it should be noted that were minor concerns that the transparency of departmental decision making was not what it should be, particularly in relation to decisions about whether new curricula should be proposed in the first place. The resolution of this issue was found to fall outside the responsibility of C-CAP. Similarly, interview data failed to identify potential solutions to the "process bottleneck" issue, other than those related to process reengineering. Such reengineering was recommended in previous work [4] thus suggesting that a productive area of future work should be to explore opportunities for reengineering the latter stages of the existing approval process. Owing to the disruptive bottlenecks that occur in the process as a result of Senate meeting dates, such an investigation should be undertaken to establish the true nature of Senate's role in the approval process and whether Senate notification of approved curricula is sufficient to satisfy University regulations.

In a number of specific areas, such as the validation of the qualitative benchmarking analyses undertaken during previous evaluation activity [4], interview data verified the resolution of a number of process and document workflow issues, such as version control and the management of curriculum review feedback. The reduction in the superfluous paperwork used to facilitate the design and approval process in the previous state was considered a particularly noteworthy change. It is also a change that assumes added significance owing to its status as the most common Pareto cause for course approval delay or rejection [4]. C-CAP has reduced the design burden normally associated with the previous state and has simplified academic review, thus corroborating previous findings; but it has also brought about a renewed focus on those aspects of curriculum design that are integral to good pedagogical practice and to high academic quality standards. In essence, the drastic reduction in superfluous bureaucracy has meant that C-CAP can better focus on the quality and specificity of essential curriculum approval information (i.e. that which is required by the University to facilitate

approval) whilst simultaneously serving forms that are less likely to stifle innovation and that are neither "daunting" nor "onerous".

The development of a central repository of approved curriculum designs was revealed by participants to be one of the most important changes to have been facilitated by C-CAP. Analysis of the data exposed among stakeholders a latent cognisance of knowledge management principles and their potential for transforming curriculum design. The curation of curriculum designs as "knowledge assets" was considered to support a number of key academic quality processes and better enable responsive curriculum design. Providing repository access to a broad range of curriculum designs was embraced due to its potential to inform the development of new curricula and its ability to support professional teaching practice. Data supported the view that a "shared intelligence" about the quality of existing curricula would be established and thus tangible curriculum design and quality benchmarks set. The repository would also provide a platform from which to disseminate explicit and tacit curriculum design practice, and would maximise the value of institutional knowledge assets by allowing the re-use of curriculum designs, thereby contributing towards institutional competitive advantage. The importance of a central repository of curriculum designs has long been a project objective [73] and its delivery via C-CAP - and its positive impact on business process and document management - were reported in previous evaluation work [4]. Its qualitative verification in this instance is therefore a positive finding and, unlike the qualitative benchmarking analysis which relied on mechanistic indicators of success, provides a well-articulated human account of its wider significance.

Linked to the improved process visibility and transparency available under the new state was the concept of process control. The ability to track, monitor and control aspects of the curriculum design and approval process was identified in the interview data as an important change effected by C-CAP, the significance of which was then corroborated by the "winning" MSC story. The MSC stories identified a number of significant changes including the reduced administrative burden associated with curriculum design, improved process transparency and opportunities to harness knowledge assets; but better control over the design and approval of curricula was cited as significant for both academics and those involved in academic quality. It was found to empower academics by enhancing their control of designs once they had entered the approval cycle; academic quality staff welcomed it as a better mechanism for controlling, monitoring, structuring and minimising errors in the quality approval process. Whilst the MSC approach was generally successful, a limitation in this instance was that stories often lacked sufficient depth and reflection. The reasons for this were multifarious but were the result of failing to control for certain key dependencies. These dependencies will feed into a publicly accessible version of a "reusable" evaluation plan, to be disseminated at the PiP project's completion in late July 2012.

Discussion of the "three orbs model" generated rich qualitative data that captured a series of conflicting participant views, which from one perspective validated the model but from the other refuted it. Contrary to the theoretical assumptions at the centre of the model, academics were generally found to support the collection of "academic", "operational" and "aspirational" information as part of the curriculum approval process and judged its collection to be a positive requirement. The model was validated insofar as participants recognised the divergent information needs required to facilitate the approval process, the need to gather "better information" and the potential this had to overload academics; but this overload was not considered to emanate from the information requested and was rather attributed to the poor mechanisms used to collect it, the high level of duplication and the "needless" repackaging of existing information, all of which were perceived to hinder the efficacy of the previous state.

The development of C-CAP has to date followed an incremental design methodology [74] which has been informed by on-going evaluation [4], [5], [14]. Not only was system development participative but participative system implementation strategies [56] were adopted prior to Faculty piloting. It was

therefore disappointing to find academic participants to be attached to using MS Word to complete curriculum design tasks, and perhaps more disappointing still since this finding corroborated the attitudes of some participants during previous evaluation activity [5]. Further data analysis and reference to prevalent systems resistance typologies suggested that the loss of academic freedom (via the interaction theory), an attachment to habitual working practices, and low levels of IT literacy were partly to blame for resistance. It may therefore be the case that a gentler transition between the previous and new state is required for some academic users. Such an approach aligns with prominent innovation diffusion techniques [75] and their application within the information systems domain [44], [76–80]. Emphasis here is on coaxing the “late majority”. Forcing such users to abandon familiar technologies can be counterproductive and the use of bridging options are often advocated whereby some choice in system adoption is provided, at least temporarily [44], [81]. In this instance the provision of MS Word templates (using form controls) could be made temporarily available to resistant users. These forms could model those served by C-CAP, thus enabling existing drafting behaviour to continue while simultaneously exposing users to the structure of the form; however, curriculum designs would still need to be reproduced in C-CAP and would - as users’ system familiarity and confidence increases - encourage drafting to occur directly within C-CAP in future. Such an approach carries several inherent risks, not least the potential for academics to subvert the process as previously described, but could be successful in promoting C-CAP acceptance, assuming appropriate safeguards are implemented and policies are communicated to academics (e.g. faculty and academic quality policies relating to the rejection of proposals that seek to subvert due process, rejection of proposals that fail to meet basic curriculum information thresholds, etc.). Future work should also seek to establish C-CAP “best practice” guidance or training to ensure key change agents such as academic quality teams maximise the effectiveness and impact of C-CAP. Such orientation would better assist those responsible for the administrative management of the curriculum approval process and would contribute towards improved system acceptance levels during future embedding of the system.

5. References

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6. Appendix A: HaSS group interview slides

HaSS group interview: C-CAP impact and feedback

George Macgregor
Principles in Patterns (PiP) project
Development & Innovation
Jordanhill Campus, 24 May 2012

Introduction

- Welcome and thanks!
- PiP background
- Class & Course Approval Pilot (C-CAP)
  - Evaluation phase
  - C-CAP piloting
- C-CAP main focus for today

Format of session

- 11:15-11:45 Discussion of:
  - Curriculum design and approval process
  - C-CAP experiences; system and process
    - Consideration of benchmarks
- 11:45-12:00 Most Significant Change
- 12:00-13:00 Lunch

Curriculum design & approval

- What do you consider to be the most significant issues with the current design and approval process?
  - May span a broad range of issues, e.g. design, approval management, AQ, etc.

C-CAP experiences

- System perceptions
- C-CAP as a vehicle for approval process management
- To what extent do you think C-CAP is more supportive for staff than the existing process?

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Benchmarking: then and now…

- PiP baselining exercise (circa late 2009)
- Five principal issues / impediments identified:
  - Process bottlenecks
  - Poor feedback looping
  - Absence of version control
  - Absence of central database of curriculum designs
  - Form size and lack of guidance

HaSS approval delay/rejection causes

- "Time delay in reviewer providing feedback due to workload constraints" (Class)
- "Assessment details flagged up by reviewers as issue, i.e. insufficient detail" (Class)
- "Issues surrounding volume/size of proposals and the time needed for review, encroaching on other activity" (Course)
- "Revisions of class descriptors required to update current teaching practice" (Course)
- "Clarity on total staff teaching hours needed to deliver the course required" (Course)

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Most Significant Change stories

- Most Significant Change methodology
  - Dart & Davies [1]: Use of "concrete outcomes rather than abstract indicators"
  - Use in large scale projects that are difficult to evidence, e.g. organisational
  - Advantages of the approach

Most Significant Change stories (cont.)

- Note a change that affected you as a result of using C-CAP
- Preferably the "most significant change"
- A few minutes to scribble notes
- Capture your explanation of the change
  - Transcribe and email for verification

C-CAP wishlist!

- What would you like to see incorporated into C-CAP?
  - What would make your role in the approval process easier?
  - What would make your contribution to the process ensure better curriculum designs?

References

1. J. Dart and R. Davies, "A Dialogical, Story-Based Evaluation Tool: The Most Significant Change Technique," *American Journal of Evaluation*, vol. 24, pp. 137-155, Jun. 2003.

Related links

- Principles in Patterns (PiP): http://www.principlesinpatterns.ac.uk/
- JISC Institutional Approaches to Curriculum Design: http://www.jisc.ac.uk/curriculumdesign

7. Appendix B: "Most Significant Change" story template

The C-CAP system is undergoing a phase of evaluation under the auspices of the PiP Project. Since the C-CAP system has the potential to change the way in which people engage in curriculum design or the way in which staff engage in the curriculum approval process, we are keen to capture qualitative data on the nature of these changes. A useful mechanism for capturing information about changes is through stories.

In this instance we would be most grateful if you could **document a change** that has affected you as a result of using C-CAP during the pilot phase. Preferably this should be the "most significant" change that has affected you. You should also try to explain why your change story is significant to you. Change should be considered as any change that may have occurred as a result of using C-CAP and the difference between C-CAP and the existing curriculum design and approval process.

Stories gathered will be processed in accordance with the provisions of the Data Protection Act 1998. Some anonymised stories may be summarised for project reporting or publication in the academic literature. Details of such dissemination will be available from the PiP project website.

(Please complete the details below and type/write your story in the boxes provided)

Title of story	
Name of person recording story /OR/ Job role	
Date of writing	
Who/what was involved?	
When did it happen?	

What happened?

And why was it significant to you?

8. Appendix C: Coding framework: thematic (super node)

Table 4: Coding framework for thematic nodes in NVivo. Note that aggregate facet nodes exist for T:4 - Previous state, T:5 - Process issues, T:6 - Qualitative benchmarks and T:10 - System perceptions.

Super-node: thematic						
Node code	**Node**	**Node definition / scope note**	**Example quote(s)**	**Sources**	**References**	**Unique source**
T:1	Academic quality	Data coded at this node pertains to discussions of the issues surrounding academic quality and its facilitation using C-CAP.	*"I think the detail in C-CAP is way beyond what we would ever expect from somebody reviewing, or proposing a class. There could be on occasion, erm, somebody would just put down, erm, a 2,000 word assignment. And obviously that's not enough information! We need a break down of different tutorials, seminars, and things that they are doing in the delivery of the class; any summative and formative assessment. But C-CAP goes into greater depth than that and breaks it down even further. So I think that'll be really useful. That's once of the big advancements, in terms of looking at assessment - which is obviously a huge priority for the Faculty".*	2	4	2
T:2	Collaboration	Content coded at this node relates to data that describes the role C-CAP plays in promoting collaboration (or not).	*"That's a big benefit of the C-CAP system. Having... Setting up a writing team, or, y'know, individuals who a contributing to the writing of a course or class, without having that extra burden of somebody who might be proposing sending their work to others for them to add all their bits and pieces. It's very beneficial...."*	2	2	2
T:3	New state	Data coded within this node pertains to stakeholders' opinions, attitudes, evidence, etc. regarding the new state (i.e. the curriculum design and approval process using technology supported approaches to curriculum design and approval - C-CAP).	*"I think, in terms of the management control side for the Faculty, I think it's pretty straightforward for us. We know what we have to do at various stages, so I think from that side of things... But I think the academics might have greater input into what they want, in terms of the form; and I think that's something that might come, certainly from the review that we held for [colleague's name] course".*	1	3	1
T:4	Previous state	Data coded within this node and all sub-nodes pertains to stakeholders' opinions, attitudes, evidence, etc. regarding the previous state (i.e. the curriculum design and approval process prior to the piloting of C-CAP).	*[Aggregate facet node]*	3	21	8
T:4.1	Paperwork	Data coded at this node describes or discusses problems with paperwork, e.g. number of forms, volume of content, etc.	*"There's a lot of paperwork, I think, to go through and I think some of the processes have to be duplicated, like asking for a class code at the end - y'know, there's a lot of that going on".* *"I do think there is, and has been, a lot of repetition in the paperwork and I think we could streamline that. And hopefully the new process will streamline that a bit. But it seems to me that the course descriptor is then repeated in different places, and I guess some of it is for different purposes, but it seems to me that it puts course teams through unnecessary hoops and we should be looking at how we can create a document that serves a number of different purposes rather than having to create different documents - or have people re-format materials for no real purpose, that I can discern".*	3	4	4
T:4.2	Working practices	Data coded at this node relates to participants' views on previous working practices (specifically under the previous state) and how they relate to curriculum design, e.g. using paper documents, MS Word, etc.	*"Which is quite a lot to do in one go. I was only doing one, and at the same time as I was doing that I was also doing the "learning online" thing for MyPlace, which I found I was struggling with because there were all these whizz kids that are used to, kind of, doing X number of functions on MyPlace, so when I came to do this it seemed slightly more straightforward. So maybe because I had been having to focus on doing so much online, when I came to the training I thought it looked like a huge amount to do online; but as I worked through - and I am only doing one module - I did find, a bit like [colleague's name], that I was having to constantly come out of it and print off lots of paper copies of things, so I had them on my desk so that I could find that piece of information. So maybe once I got*	1	10	2

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			used to doing that, maybe next time I would be focussed on, "I need that for that section and I need that for that section". It probably would become a lot easier".			
T:5	Process issues	Underlying or fundamental process issues that are or are not addressed by C-CAP. This node captures general "process issues" but also functions as an aggregate facet node for all sub-nodes.	*"I suppose we know because we're dealing with this; but I think it's not until an academic would come to ask, "What is the process?", you know what I mean? It depends on their familiarity, if they were in Education or LASS, how that went before".* *"Well, I think, some sort of process is always happening. A bit of consistency wouldn't hurt and I think... given that faculties have undergone a restructuring, perhaps, well established but different practices will continue to exist".*	3	29	6
T:5.1	Process control	Data coded at this node pertains to discussions of control over the curriculum approval process using C-CAP.	*"I think the new system will give the Faculty and the Faculty Team greater control and better monitoring of the system. At the moment there are one or two individuals who are dealing with the current system and trying to monitor that, with a high volume of new classes being proposed.... Sometimes there are errors that occur in the current system that I don't think will then appear in C-CAP. I think there will be greater monitoring and control and structure to the process".*	2	4	2
T:5.2	Tacit practices	Data coded at this node relates to tacit practices, e.g. their prevalence.	*"I think it would be really helpful. As I say, the passing on of practice wisdom from one person to the other is not particularly scientific, and it's obviously subjective. For anyone who is thinking about designing a new course, to be able to go and look at a range of different approaches, or different kinds of course, and to get some kind of... Not a rigid template, but ideas about how you might put a course together, I think would be helpful because it's not something that, it seems to me, the University offers. I'm not conscious of ever having gone on a course about curriculum design, for example. So I think it would be helpful if there was a place you could go to".*	1	2	1
T:5.3	Transparency	Data coded at this node pertains to the transparency (or not) of the curriculum design and approval process.	*"So if I was starting afresh and thinking, "I think to introduce a new course and I think it's a really good idea", it would be useful to have a central place where I could go to see, "What are the things that need to be done now?". Some of that is improving, as this project as rolling out - information is clearer…".*	3	18	6
T:6	Qualitative benchmarks	Data coded at - and within - this node pertain to the qualitative benchmarking conducted during WP7:39 and by the baselining exercise. Coded data specifically addresses qualitative benchmarking analysis. This node functions as an aggregate facet node for all sub-nodes.	*[Aggregate facet node]*	3	37	6
T:6.1	Central repository	Data coded at this node evidences user perceptions of C-CAP's success in addressing the central repository issue and associated issues.	*"I think the benefits of having something central are enormous because, at the moment, there is such a lack of consistency, people keep documents in their own wee rooms; you don't know where to go to see what a course document looks like unless someone happens to have it and they send it to you…".*	3	7	5
T:6.2	Form size and guidance	Data coded at this node evidences user perceptions of form size and guidance served by C-CAP, normally in relation to the previous state.	*"I felt less exhausted having read it all, than I have in the past. Having been presented with two or three hundred pages worth of stuff, only 20 or 30 of which were really crucial. So, no, I thought it was much more streamlined."* *"I think what was happening in Education was much more rigorous. Even the University documentation... The folder I got, I thought "Oh my god!" There was much more detail required than the University process, and I think, "Why is that? What's wrong with that, that the University thinks that's enough documentation, why are you being asked for all of this other stuff?"* *"The guidance notes I think are very useful; the sort of help areas, if you're struggling and you're not entirely sure what this requires. It's systematic in its approach. It makes sense*	3	13	6

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			from the starting point to the end point when writing a new class or course".			
T:6.3	Poor feedback looping	Data coded at this node evidences participants' perceptions and experiences of the C-CAP feedback mechanisms. Feedback mechanisms are normally contrasted with the mechanisms used under the previous state.	*"When the proposal goes to a reviewer, it's pretty much they can look at the form and then incorporate feedback their feedback straight into that form, rather than having to complete a separate form as it currently is in the process at the moment. So they can basically read what is written by the proposer and then underneath they can incorporate their feedback straight into the section underneath, and I think that's a lot easier for the person who is reviewing that class or course".*	2	3	3
T:6.4	Process bottlenecks	Data coded at this node pertains to the discussion of process bottlenecks and their effect on the efficacy of the curriculum approval process. Includes C-CAP's success in address process bottlenecks.	*"There's a cycle of meetings of Senate, boards of study, faculty academic committees, and with the cycle comes deadlines. And people work to deadlines. What you expect and what you get is a torrent of new class approval forms in the immediate period before a deadline".* *"Fortunately, the great majority of them were carefully done and were not a problem. But you did have a feeling that if something had real questions that needed to be answered, or bits about which you had real doubts, er, was submitted very close to the deadline and you try and knock it back for clarification or some additional input... Sections that have been more or less missed out by the person submitting it. You'd be running out of time very quickly to get it back to get it approved. I mean... Y'know... If, as [name of colleague] says, Senate treated the whole process as an on-going one and the University itself didn't establish fixed dates by which these things had to be completed, and there was an on-going process of class and curriculum approval, then it could be treated more or less as routine business by the faculty. The Academic Committee doesn't actually look at them. Academic Committee knows that they have been...".*	3	10	5
T:6.5	Version control	Data coded at this node evidences user perceptions of C-CAP's success in addressing version control and associated issues.	*"I mean I think from our point of view, what we would like - which is what we tried to do with class proposals and scrutiny - was maybe have two people at least looking at each class proposal and then putting... But in a practical sense it just didn't work out because if they sent something back with track changes and then somebody else hadn't... How then.... That superseded that.... It was just getting into a mess and it ended up being just one person really. And I don't think quality wise that's very good, y'know".*	3	4	3
T:7	Reorganisation	Data coded at this node explores the influence of reorganisation on design and approval processes.	*"Well I think [departmental scrutiny] always did happen across the University; but my feeling is that it's become frayed. The shift from departments to schools, and I'm not so sure it's as strong as it used to be. It was always a very effective process in my department, when we had a teaching committee... The committee structures from departments have gone a bit, I think".*	1	4	2
T:8	Resource and planning	Data coded at this node explores the growing importance of the financial implications, resource issues, planning issues, etc. associated with the approval of new curricula.	*"Sometimes that's not even made explicit in the current system! So that's something that will at least be picked up. Moving towards to the review of resources is something the Faculty are really going to look at more closely, in terms of class development within the Faculty... In terms of course development, there is a financial forecast for expenditure and income has to be created; but in terms of classes, that's not looked at in any great detail, so that's something the Faculty and the Vice-Dean definitely want us to look at, particularly staff time".*	2	4	3
T:9	Review of curricula	Node pertains to data that discusses the curriculum review process.	*"If the Academic Committee was required to examine every single... required to discuss every single proposal, it would take hours and the outcome wouldn't be any different".*	3	16	5
T:10	System perceptions	Data coded at this node pertains to participants' perceptions of C-CAP during piloting, e.g. experiences, attitudes, etc. This node captures general discussions or statements pertaining to general system	*"I didn't think it added anything to the experience, to be honest. I think a group of people sitting round and having to look at documentation on a computer that wasn't of an appropriate font size for all the people who were there. I didn't find it user friendly or instinctive. I didn't see what it added to the process, of people having their own set of documents that people went away with and read through, and came back with comments on. It didn't seem to me to add anything".*	3	19	4

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		perceptions, but also functions as an aggregate facet node for all sub-nodes.				
T:10.1	System logic	Data coded at this node relates to potential improvements to C-CAP system logic, logic that should be included in future development work, etc.	*"Part of our course is being delivered with someone who works at Glasgow University. So I put in 50% delivered by an outside... And it came up and said, "Collaboration agreement required". Now, there was no.... You couldn't click on that to find out how you obtain a collaboration agreement; I don't really know what that is. Just some fine tuning like that so that you're not spending ages phoning up trying to find out what is this, etc. Similarly, with the learning outcomes, I had to phone [colleague's name]... Where do I find? Y'know, because there's different ones for different types of courses".*	2	4	3
T:11	Three orbs	Data coded at this node relates to attitude, opinions and perceptions of the "three orbs model" and the extent to which to accurately reflects curriculum design and approval "reality".	*"I'm not sure because I do think we have a duty, a responsibility to be accountable for what we teach. Students have a right to know what it is they are going to be taught on any given course and also how they are going to be taught. I suppose it's not so much that I think there's an overload of information demanded of us but sometimes you're required to give that same information in a number of different arenas. And that's not helpful. I think if we could devise a system where the information that was required of you could be given, as I was saying earlier, in one format for many purposes, so that you don't, kind of, repeat or cut and paste... Do that kind of thing. If we were able to produce a more multi-purpose document then that would be helpful and if people need that for different purposes it should be flexible enough for them to be able to use it for whatever purpose. I think sometimes we do get caught up in trying to reproduce information for students in a different format than for academics, and actually if the information... Whatever we're telling students should be sufficiently clear and, erm, workable in order to fit other purposes as well. Y'know? We shouldn't need to be repackaging information for different purposes".*	3	5	4