RECOGNIZING RISK-OF-FAILURE IN COMMUNICATION DESIGN PROJECTS

JOYCE YEE, MATTHEW LIEVESLEY, LOUISE TAYLOR

Northumbria University
Yee, Lievesley, Taylor, 228-251

Rhode Island School of Design
Providence, Rhode Island 02903

ABSTRACT

The pace of commercial graphic design practice presents very few opportunities to conduct user research after a project's launch. This makes the design team's ability to anticipate and address risks during the design development phase even more important, recognized in the astute observation from Tim Brown, CEO of leading international design group IDEO, that sometimes you must "fail early to succeed early."

This paper presents the methods and strategies used by the Centre for Design Research's (CfDR) creative team to mitigate risk during three communication design case-study projects. Elements of failure are identified in each of the three cases and presented, with discussion of where and why they occurred, and the possible approaches for reducing the risk of such problems re-occurring. To provide structure to the discussion, the paper frames each contributory issue as either a usability, communication or technical failing.

The analysis demonstrates that the factors contributing to design process failures are often complex and multi-layered. To avoid a poor design project outcome, it is evident that consistent risk monitoring is present in all stages of a design project, but might be improved by better understanding how issues change their degree of importance and potential negative impact during the course of the project. Developing a mechanism to enable teams to objectively identify and manage these fluctuating project risks, will contribute to a more coherent and effective strategy for recognizing and managing future design projects.

INTRODUCTION

Few practicing designers are so psychologically secure and so confident in their own abilities that they have a healthy appetite for post-mortems when projects go awry. The majority would likely move swiftly on, particularly as designing is a creative and therefore quite personal endeavor. But perhaps this anxiety prevents the designer from considering factors that are really systemic rather than personal failings and therefore miss the opportunities for design process improvement they imply.

This paper has provided the authors with an opportunity to reflect on past projects and identify the strategies used to manage risk and prevent project failure. It focuses on those failures that occur during a design process and have the potential to threaten the satisfactory completion of a project—rather than failures of a product on reaching market. If design process failures are preventable, or at least possible to mitigate, the likelihood of a design failing in the market will be considerably reduced. Case studies present reflection on what the team understood to have happened during the course of the project and, as a result, their tone is personal and reflective. Three design projects were selected by the authors, all delivered within the commercial constraints typical of graphic design practice. The reflective review of those projects provides a glimpse into the complex nature of problems arising in this setting.

WHAT CONSTITUTES A DESIGN PROCESS FAILURE?

Design process failures are not the same as creative failures—they are not about evaluating which design solutions might have been more successful, but rather identifying a failure to meet the various expectations of user, client and design team. For the user, a piece of visual communication should be functional and avoid misinformation. For the client, it should fulfil its communication purpose, and be delivered within the agreed time and cost. For the design team, it should answer the brief, be delivered on time and within budget and, most importantly, provide a design solution that meets (if not surpasses) user and client expectations. To provide structure to the discussion, the paper frames each contributory issue as either a usability, communication or technical failure.

Usability failure

Usability failures are those attributed to functionality problems that result in misuse of a product, or the user's failure to perform an intended task due to a fault of the design. Usability in this context can also encompass the miscommunication of a visual or textual message. Usability failures tend to be more critical for projects at the functional spectrum of communication design, such as interactive and web-based projects.

Communication failure

Communication failures are those attributed to a breakdown in communication between the designer and either their stakeholders (external) or their team members (internal). Communication failures can occur in any type of visual communication project and are not bound by its design purpose. Communication failures are probably more commonly discussed in Design Management or Organizational Learning literatures. However, as many of the problems that arise in design projects are communication-related it would be remiss to omit these issues from our discussion of ways to minimize design process failures.

Technical failure

The authors identified three types of technical failures: production-related, skills-related and context-related. Examples of production-related failures include errors in print production, software platform compatibility or inappropriate file formats, and these types of failures are equally distributed across different forms of media. Skills-related technical issues can be attributed to the available expertise of the design team. Context-related issues can be harder to identify but include changing external project conditions such as budget and timescales, which are often beyond the apparent control of the design team.

METHODOLOGY

The case studies for this paper are past projects carried out in the Centre for Design Research (CfDR) at Northumbria University. CfDR is a multidisciplinary design group that offers design services ranging from product design and engineering, to graphic design activities such as print, web and interface design to design research. This paper will focus on graphic design projects.

The case studies selected were chosen to highlight good examples of design process failures and strategies in the three areas of usability, communication and technical issues. The case studies were reviewed and analyzed by means of a hindsight review using a three stage process:

Stage 1: A review of project documentation including original brief, meeting notes, client correspondence, planning documents, research materials, sketches, concept boards, user feedback, system architecture and design iterations. This stage provides an 'aide memoir' to enable an accurate description of events.

Stage 2: To conduct what Greenwood (1993) describes as a 'cognitive postmortem' based on Schön's (1987) reflection-on-action process. Reflection-on-action is described by Schön as thinking back to what we have done in order to discover how our knowing-in-action may have contributed to an unexpected outcome. Each member of the project team produced a reflective report, responding to four key prompts in order to elicit reflection on the key decisions taken during the project. These prompts asked the respondent to:

- Describe the project in detail
- Describe the problems anticipated at the start of the project
- Describe the actual problems that emerged during the project
- Reflect on what was learned from these problems, and the strategies taken to ensure they would not re-occur in future projects

Stage 3: Validation of the analysis result by the project team, supported by peer feedback from team members on report conclusions.

Any methodology that uses hindsight review will always be susceptible to unintended bias. When we reflect in hindsight, it is difficult not to be influenced by our knowledge of the outcome. Fishchhoff (1975, cited by Jones, 1995) describes this as 'creeping determinism.' To address this, we have cross-referenced our personal recollections with project records such as meeting documentation, reflective notes and externally validated papers wherever possible. Stage 3 provides an additional level of validation by the project team members, reducing personal bias on the final project outcomes. Due to the nature of design practice, which rarely allows for reflection-on-action due to time constraints, this method was deemed most suitable for the purpose of this study.

The format of the case studies presented consists of a project description, discussion of anticipated threats at the start of the project, an analysis of why some threats were well-managed and the lessons learned from failures that occurred during the project. In evaluating each project we considered the number of anticipated issues and challenges in relation to the actual problems that arose. This list of problems (or 'threats') can be divided into three categories:

- High risk—issues with high levels of uncertainty and the potential to be 'show-stoppers' to the successful delivery of the project.
- Medium risk—issues of minor concern and with some uncertainties present, which we were reasonably confident of managing successfully.
- Low risk—issues of no real concern, where the challenges and work required may be significant, but which we were confident was comfortably within our capabilities and experience and did not therefore pose a significant threat to the success of the project.

CASE STUDY 1

Project background and context

A newly formed healthcare company was developing an innovative service offering aimed at elderly patients and their carers. CfDR were commissioned to work on interface design as well as corporate branding, exhibition graphics and a promotional website.

Anticipated threats to the success of the project

We understood this to be a project with multiple deliverables, all of which our two-member team would need to work on simultaneously and complete to a tight deadline, created by the company's impending launch at a national conference.

At the early formative stages, the potential 'show-stoppers' to the project's success were perceived to be:

1. Limited availability of development time in relation to the number of required design outputs
2. Definition of the company aims, objectives and service users
3. External development partner's responsiveness to, and ability to implement within their development timescale, our interface design proposals—as initial email contact suggested our influence on this project component could be limited

We had some minor concerns about:

1. The possibility of 'feature creep,' where a client wishes to extend design work beyond the agreed project brief and budget
2. Website development as additional work outside of the original project scope

We had no real concerns about:

1. Outsourcing work—as the addition of website development to our project brief initially seemed unlikely, due to the client's reluctance to commission it as an additional project component

How the threats were managed and where failures occurred

Table 1 tracks anticipated risk levels at the start of the project against actual impact upon the project. The issues are color-coded into high, medium and low-level risks. Identified failures are also classified as technical, usability or communication failures.

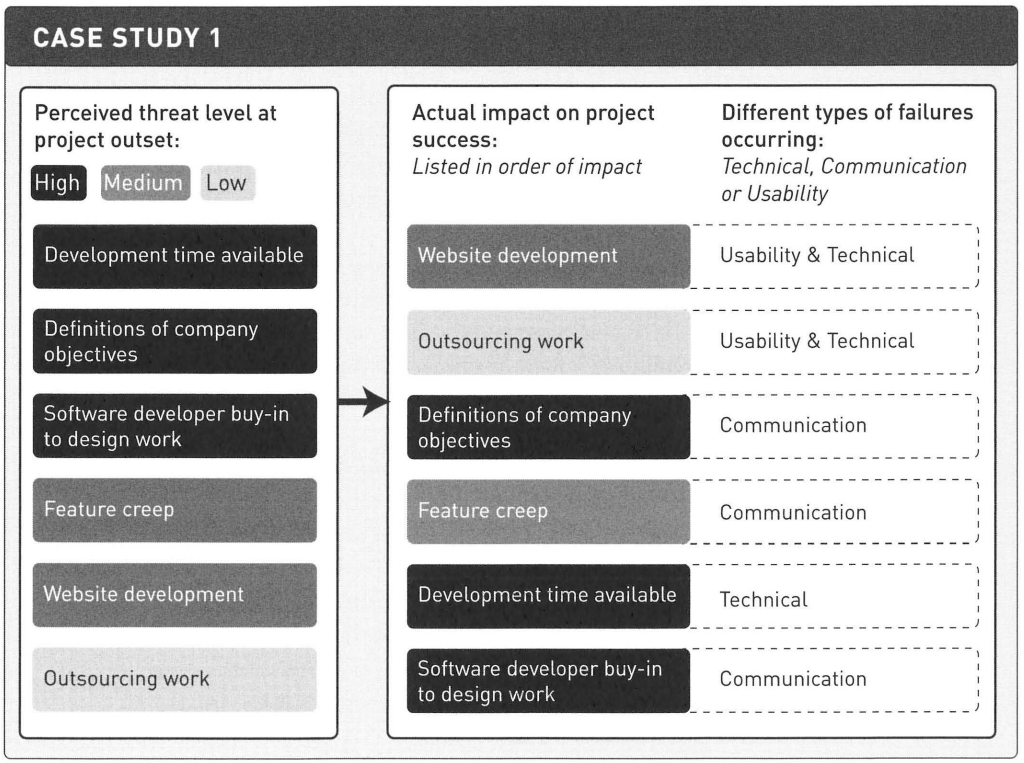

Table 1
Anticipated problems compared with actual problems arising during the project.

The risk analysis table indicates that, while we managed the anticipated 'high risk' issues well, we were less successful in ensuring that other issues did not evolve into higher threats. This was probably because we focused too much on managing the higher-level threats at the beginning of the project, and did not track how other identified threats were progressing.

Website development

We originally thought it unlikely we would be working on the website as the client seemed reluctant to commission the additional work. However, eventually they did decide to commission a website and content management system (CMS); this became a large part of our overall work and caused several major problems. Because of the client's limited budget, we chose to utilize a free open-source blogging platform to produce the website. Two main issues arose from the use of this platform: server compatibility and usability. Due to an oversight on our part we failed to confirm the type of web hosting platform currently used by the client, resulting in the production of a website that was incompatible with their web hosting package; we were forced to engage in an extended research and discussion process to come up with a cost-effective solution that would meet the client's current and future needs. In addition to this compatibility issue, the client found the website's CMS system difficult to use, despite our provision of training sessions and technical support and eventually chose to remove the website from the public domain and identify their own alternative solution.

Outsourcing work

The outsourcing of website development to an external company meant that we were at arms' length from their development process, and some problems with the implementation of our design work were not revealed until the developer's work was nearly complete. We spent a considerable amount of time 'bug checking' the website and sending lists of errors for the developers to resolve; this continued beyond the launch of the website as the client identified more problems with usability and functionality.

Definition of company objectives
At the start of the project we conducted a service mapping exercise to assist the client in identifying the company's full range of services. We assumed that this exercise would help to bring shape and focus to the client's objectives for the company's offering. However, the client's thinking about the structure of their service and products continued to evolve throughout our work for the company—meaning that requirements across all of our project components were also subject to ongoing change.

Feature creep
As anticipated, we received several requests for design work outside the agreed project scope. Given the overall size and financial value of the project we chose to undertake some of these tasks as 'gestures of goodwill.' However, this created difficulty on occasions when we couldn't reasonably accommodate minor tasks and had to assign them an additional development cost.

Development time available
Careful scheduling of development of the various project components was undertaken, to ensure all work was delivered when it was needed. While some slippage inevitably occurred in places, the existence of key event-based deadlines like the company launch helped to keep development moving at a brisk pace.

Software developer buy-in
Despite our initial reservations, the external development partners were enthusiastic about our design suggestions and commented favorably on our contribution to their work.

Lessons learned from 'failures'
Match budgets to appropriate solutions (and do not force one to fit the other).
The failure of the website stemmed from the fact that there was a mismatch between available budget and the required functionality of the website. We believed that the cost saving in using a free open-source CMS would give the client better value for their money. However, in the end they felt that the system provided was not fit for use. We concluded that we should have recommended our preferred option of a higher-quality bespoke system. Even though this would have cost more, the client would have understood how that cost related to the quality of the end product.

Ensure clarity on project scope and deliverables

A sign-off should be a sign-off. Make the client understand that this draws a line under a stage of work, and signifies the delivery of a finished component. Within reason, any work beyond that should be re-negotiated.

Prioritize project components

If the client is reluctant to prioritize project components, do it for them. Make clear how delays, or the introduction of additional tasks, will influence the outcome or delivery of key project components.

CASE STUDY 2

Project background and context

CfDR was commissioned by a research and development center for renewable energy to develop a Solar Thermal 'Trolley' demonstrator unit with an accompanying teaching pack. The purpose of the project was to raise awareness of renewable energy among secondary school pupils, with a view to encouraging them to consider careers in science and technology. There were three main components to the project: the Trolley demonstrator unit, interactive teaching materials and a project website.

For the purpose of this paper, we will concentrate on the visual communication aspects of the project, which were the teaching materials and the project website.

Anticipated threats to the success of the project

At this formative stage in the project, the potential 'show-stoppers' to the project's success were perceived to be:

1. Motivating teachers to incorporate the use of the trolley and curriculum materials into their lesson plans and ensuring that the trolley did not end up gathering dust in a cupboard
2. Gaining access to teachers and students in order to understand the environment of use and develop appropriate levels of content

We had some minor concerns about:

1. Content team: people responsible for writing and editing the content for the curriculum CD-ROM
2. The ability of the proposed website to create a 'learning community' enabling schools to share their collected data
3. The technical challenge of streaming live data from a fixed solar collector to the project website

We had no real concerns about:

1. The technical challenge of producing the curriculum material and developing the project website

How the threats were managed and where failures occurred

Table 2 (see below) tracks anticipated risk levels at the start of the project against actual impact upon the project using the same format as in case study 1.

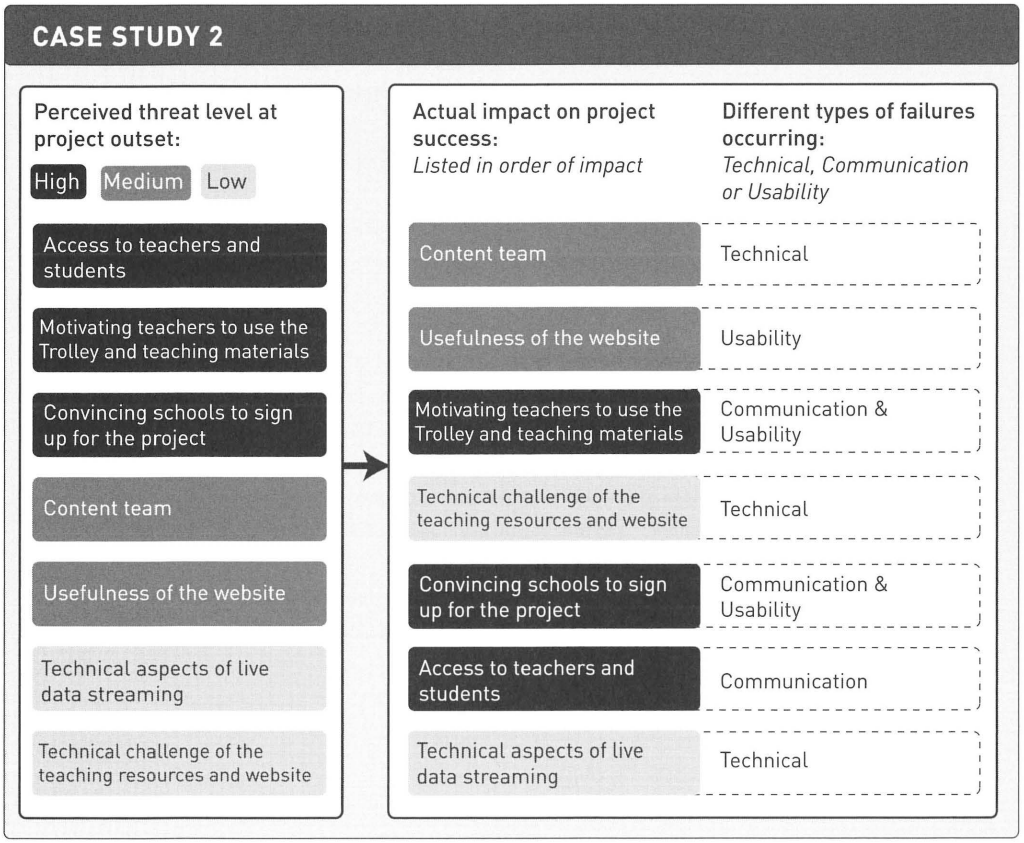

Table 2
Anticipated problems compared with actual problems arising during the project.

The risk analysis table affirms that our early and determined effort at gaining access to teachers was key to managing this risk well. However, we were perhaps too late in recognizing the importance of securing additional budget for a content writer after our initial meeting with the teachers. Other issues such as convincing schools to participate were resolved more through external factors than our own direct action (see section below).

Content team

We stated from the outset that our original budget did not account for the provision of content authoring by our team, making clear that it would be the responsibility of a Content Team (which we believed should be comprised mainly of teachers) to write and organize the teaching materials to which we, the Design Team, would respond. Although the client did offer an additional budget to pay for access to teachers, we realized after our first initial meeting with those teachers that it would be difficult for them to dedicate any time to content authoring. We also did not have enough budget to pay for a professional writer to take on this role. As a result we had little choice but to take on the responsibility of content creation ourselves; we used our additional budget to pay for content review meetings with a small group of teachers from different subject areas, who provided us with feedback on our design work at key points during the design development.

Content authoring proved to be a huge undertaking, which on occasion drew our focus away from the more creative aspects of the project. This probably limited what was achievable on the project budget, because we effectively reduced time spent on design, particularly production time, to accommodate the writing process.

Usefulness of the community-based website

The client was keen for a website to form part of the teaching resource, believing it could offer a platform for datasets gathered from the Solar Trolley to be archived and shared. We were unsure of how useful it would be for teachers and students to have access to archived data, or how practical it was to expect teachers to spend time uploading the data onto the website. We felt that the budget would have been better spent elsewhere, such as on consulting more with the teachers on the likely benefit of the proposed functionality. Although this issue was not a major threat to the overall success of the project, we did not manage to convince the client of a better alternative.

Motivating teachers to use the Trolley and the teaching materials
Convincing schools to sign up for the Solar Trolley was only half the battle. Once the school had signed on and received the trolley and materials, it was equally important to consider what would motivate teachers to incorporate the resource into their scheme of work. We carefully considered the relevance of the Solar Trolley to the current UK teaching curriculum, the way a lesson is structured and delivered, technology available within a typical classroom, the type of learning activities currently employed and the resources that teachers find most useful. As a result of our research and classroom observations, we produced twenty-four teaching activities with printable worksheets, animations, interactive exercises and guidance on differentiation for higher and lower-ability students.

Technical challenge of the curriculum material and project website
We had no real concerns over the technical challenge of producing either the curriculum material or the project website. However, we did encounter a problem with the print production of a polypropylene folder used to contain the teaching materials. The project logo printed onto the spine of the folder proved illegible on the final printed goods and we believe there were two reasons for this error: our difficulty in visualizing a mock-up that could replicate the translucent nature of the intended folder material, and the fact that the project logo (which we did not design) consisted of gradients that did not translate well when screen-printed. As a result of this error, we had to send the folders back to the printer for a reprint over the affected area—for which we had to bear the additional cost.

Convincing schools to participate in the project
Creating demand for this project was an important issue, which was recognized early on by the client. Even though the Solar Trolley and its teaching materials were to be provided to schools free of charge, the project team was unsure how schools would react to the project. Resources which are given away free of charge often have very little perceived value and are easy to neglect or ignore, so we knew that if the client did not have a marketing plan in place our efforts may not get noticed at all. However, we were fortunate that the client recognized the importance of promotion and engaged their marketing manager to work with us on project promotional activity, targeting the appropriate people within schools to help champion the project.

Access to teachers and students

Having worked with teachers before, we predicted that their heavy workload might make it difficult for us to gain significant access to the people we needed. From the beginning of the project we stressed to the client how important it was to speak to teachers before making any major design decisions. Luckily, the client was able to recommend a school that would be keen to participate in the project due to their interest in the renewable energy agenda and we were able to arrange four twilight meetings and a day of classroom observation. Overall we managed this perceived threat well due to our constant reinforcement of the importance of the issue to the client.

Technical aspects to live-data streaming

At the start of the project there were a lot of unknowns related to the technical requirements of streaming live data onto a website, as we did not have the technical expertise in-house to evaluate the complexity of this task, and also our client was unable to specify the type of technology they would be using to capture the data. This issue was only resolved in the latter half of the project when we were able to bring in appropriate technical expertise to complete the task. We managed this risk by managing the expectations of the client in terms of what would be feasible within the agreed budget, and by ensuring that the web developer we hired to develop the website database was made aware of this requirement at the outset.

Lessons learned from these 'failures'

Get clarity on content creators

We underestimated the time and money required to write the content, and did not push the client for more money to fill this gap, instead taking it upon ourselves to create the content in order to avoid jeopardizing the project. For future projects relying heavily on learning and teaching content, we must ensure that a content team has been appointed or else get assurances from the client that they will take responsibility for delivering content during early project negotiations.

Re-evaluate the original brief to ensure relevance

The project team should always re-evaluate the business case for project components during development, in order to ensure that decisions made early in the project are still valid.

User access challenges

Gaining access to users is a challenge in every project. It is useful to start the conversation about accessing users with the client as soon as possible and if necessary, as in this project, allocating a budget to offer an added incentive to potential participants. Incorporate these consultations into the overall project time plan and allocate plenty of contingencies, either in terms of time or identifying alternate sources of user feedback.

CASE STUDY 3

Project background and context

The design brief was to create a web-enabled tool to improve existing recruitment procedures for a design school in a UK university. Central university systems, which were adequate for the majority of academic subjects, were not always appropriate for design. In the case of overseas student recruitment, online application forms existed but this did not accommodate the visual, portfolio-based selection process that the art and design schools used to identify applicants with the most potential. Existing practice therefore involved the posting back and forth of physical CDs, with the imagery they contained remaining fairly meaningless without the presence of the designer to explain the thinking processes behind the work. A suggestion at an internal university conference was that this could surely be developed as an online solution.

Based on initial research with users, the CfDR team tabled a proposal for a pilot project that would result in a reduction of decision-making turnaround time from an average of six-weeks to seven working days. The proposal for a pilot project was accepted and a developmental budget secured for this work. As well as the delivery of a usable, fully functioning web tool, the project's ambition was to achieve important elements of policy reconfiguration and behavior-change through the adoption of a service-level promise.

Anticipated threats to the success of the project

CfDR understood this to be a service design project, rather than simply a web-development project from very early on. A service design project involves the planning and organization of components that make up a service (such as communication, people, infrastructure and material) in order to deliver value to the users of the service. As such, we expected the toughest challenges to be 'behavior change' issues, along with the policy dimensions of the proposed new service.

At this formative stage in the project, the potential 'show-stoppers' in terms of the challenges to the project's success were perceived to be:

1. Getting student recruitment agents based overseas on-board with the new process
2. Trusting design school staff with recruitment decisions that would affect the performance of several courses that were jointly owned with other schools
3. Offering an effective alternative to the current selection practice, usually based on face-to-face contact and discussion and which we expected to vary substantially across the wide range of disciplines taught in the school

We had some minor concerns about:

1. Course leaders failing to prioritize decision-making for overseas applicants, so that a consistent level of service could not be promised
2. Points of contact between the new service and existing Management Information Systems

We had no real concerns about:

1. The appetite of potential overseas applicants to remodel their project portfolio in order to submit their application
2. Getting buy-in from the School's Management Team (SMT), which was funding the work
3. The technical challenge (although we recognized it as such) of delivering a working pilot. On the basis of other successful projects we were reasonably confident we could conceive and deliver an appropriate solution

How the threats were managed and where failures occurred

Table 3 (next page) tracks anticipated risk levels at the start of the project against actual impact upon the project using the same format as in the previous case studies.

CASE STUDY 3

Perceived threat level at project outset: High / Medium / Low	Actual impact on project success: *Listed in order of impact*	Different types of failures occurring: *Technical, Communication or Usability*
Getting the agents on board	Getting SMT buy-in	Communication
Assuming ownership of shared courses	Linking in with other MIS and existing practice	Technical
Providing a good alternative to face-to-face selection	Course leaders responding on time	Usability & Communication
Course leaders responding on time	Getting the agents on board	Communication & Usability
Linking in with other MIS and existing practice	Outsourcing work*	Communication & Usability
Motivation of applicants	Motivation of applicants	Usability
Getting SMT buy-in	Assuming ownership of shared courses	Communication
Meeting the technical demands of a working pilot	Providing a good alternative to face-to-face selection	Technical
	Meeting the technical demands of a working pilot	Technical

* New issue that emerged during the project and was not anticipated at the outset

Table 3
Anticipated problems compared with actual problems arising during the project.

The risk analysis table highlights that while we managed the higher level threats well, we did not anticipate, or deal well with, the lack of ownership of the project, which resulted in the main project failure. A lack of political will within the SMT to enact systemic change also resulted in poor integration of the current system with existing Management Information Systems.

Getting the buy-in of the School's Management Team (SMT)
The failure to secure long-term buy-in from the School's Management Team ultimately resulted in the website being taken offline. Two years after its launch, the website was shutdown after the SMT decided not to continue supporting the cost of web hosting. Although we had minor usability problems relating to the user interface for site administrators, the system was working well and had over fifty applicants on its database. The website shut-down was very disappointing considering the fact that no formal evaluation was undertaken to identify how successful the system had been in fulfilling its initial project aim. The design team was also confused as to why the shutdown decision was taken, given that the SMT was very enthusiastic throughout the project's development.

Linking with other Management Information Systems (MIS) and existing practices
The university had a number of Management Information Systems and processes in place to deal with overseas applications. The new system had to account for their information requirements, data transferability and integration. In the end it proved impossible to change the way the university handles information and we were forced to adapt our system to the existing MIS, even though this meant that at certain points in the process data had to be manually duplicated.

Course leaders responding on time
We had assumed that if we built a usable and functional system that was demonstrably better than current practices, convincing users to adopt it would be effortless. However a combination of 'technology-phobia' and an unwillingness to embrace change meant that some course leaders were not fully committed to the new process.

Getting the agents on-board

We initially thought it might be difficult to convince overseas recruitment agents to use the new system, as it could be perceived as an additional barrier for students wanting to apply. However, through a combination of communicating the right message and demonstrating the functionality of the system, this issue become less of a risk. Early conversations with agents informed us of the key characteristics and functionalities that they would require from the system. We also stressed to them that, instead of a decision time of around two weeks, the new system could guarantee a response in seven working days.

Outsourcing work

This was an unexpected issue that emerged during the project due to the technical requirements of the new system. We hired a freelance web developer to work with us to meet these requirements, however halfway through the project this individual moved to another country. The main problems this caused us were in communication and management: it was difficult to contact him about arising issues, which ended up being discussed and negotiated through emails and online chats. This unexpected change in the working relationship between the main designer and the web developer meant that problems took longer to resolve, which subsequently caused delay to the overall project timeline.

Motivation of the applicants

The risk of applicants being unwilling to use the system was managed through the careful consideration of usability issues and consistent testing of the system during development. Although we did not manage to get actual users to test the system during development due to the practicality of recruitment, we did manage to test the system with current overseas students. We were also careful to test the system with users who were unfamiliar with the project, to ensure there was no bias in their evaluation. The step-by-step structure of the system meant that the user was effectively 'chaperoned' through each step, minimizing the chance of errors or confusion.

Assuming ownership of 'shared' courses

This risk was managed by inviting the participation of the administrators of the shared courses from the start of the project. Contrary to what we feared might be an unwillingness to let the design school assume ownership of shared courses, the other schools had no objection to this once they saw how the system could help speed up the application process for their students.

Good alternative to face-to-face selection
We initially assumed that there would be too much variation in the evaluation criteria of a potential student, making it difficult to synthesize these requirements into the proposed new system. However after a series of consultations with different admission tutors, we concluded that the evaluation criteria for all subjects were fairly similar, and were able to synthesize these criteria into a set of general requirements.

Lessons learned through these 'failures'

Get clarity on project ownership
It felt great to be acting as both client and contractor on this project, however this led to a poor level of buy-in from the (notional) project owner and when it was time to push on the implementation the will and urgency was not there to 'make it happen.' Have a single project owner (usually a client of course), but be sure they are accountable, for example, to a stakeholder group with authority, otherwise they may act whimsically.

Nurture the project champions for when you will need them most
Don't adopt the attitude that good work will speak for itself. You will require different types of project champion at different stages of the project. Repeatedly make the case as to why the project is important, keep it high on their agenda by acting with a sense of urgency. Also make sure there is a governance/ownership framework laid out from the start, and that the right stakeholders play a part in order to avoid subjectivity.

Are you sure we all want the same thing?
In this case, the project owner and users (course leaders) had a natural conflict of interest, as the project owner needed to 'sell places' whereas the course leader prefers to have tight quality control in order to avoid recruiting potential underachievers.

Work with the key stakeholders and then work with them some more
Build in some contingency budget, specifically to provide directed support to key stakeholders whose opinions you need to change—especially if they might be resistant. One key stakeholder in this project lacked confidence with IT, and would normally be acting alone in a remote setting, where you would expect them to be even more risk-averse than usual.

Have a legacy plan
Plan for a post-project champion to support the system (financially and politically) in order to ensure the project's long-term future. It may help to include a section on how the system should be supported after the project has ended in the initial proposal.

CONCLUSIONS

No one category of failure was more likely to prove catastrophic
When analyzing the case studies in detail, we found that that it was helpful to categorize the failures encountered rather than treat them all as general design process failures. However, we weren't able to draw any conclusions from these cases on which category was the most likely to lead towards a whole-project failure.

Each team member had different perceptions of the project's failings
Perhaps due to their different responsibilities in each project, in comparing each team member's reflections it is evident that, while each person highlighted similar issues, their perception of which issues posed the main threat to the project were very different. We found the process of reflecting on how the threat-level of each issue had changed over the course of the project enlightening. It seemed a useful means of encouraging constructive critique within the design team, and we believe this experience will help us to better identify and address potential threats to future projects.

Usability issues did not significantly contribute to project failures in the cases reviewed
In our analysis of these three case studies, we did not uncover any major usability failings, perhaps because we already observe a strongly user-centered philosophy in our team. We routinely spend a considerable proportion of the budgeted hours planning, recruiting and consulting with users at different stages of each project to mitigate risks in this area.

Even a strong design solution won't speak for itself so keep communicating

It is not enough to produce an exceptional solution in terms of usability and technical achievement if communication and particularly ownership issues are not addressed. For example, in Case Study 3 the lack of buy-in from some members of the School's Management Team took us completely by surprise and emerged very late on in the project. As we were not prepared for this problem, we probably did not put as much effort into 'selling' the new system internally as was required. Championing new developments might seem best focused on those areas where resistance is anticipated, but this must not lead to complacency with other key stakeholders.

Implications for Design Practitioners

1. *A visual risk management tool*

   While we were successful at managing high-risk issues across all three case studies, we failed to anticipate the impact of other issues. Visualizing how key risks change throughout a project (tables 1-3) as we have for this paper could form the basis of a useful real-time project-tracking tool for design practitioners, reducing the possibility of low risk issues becoming a major concern. It could be used to consolidate end-of-stage thinking into concise risk-trend information for the whole team to discuss and take account of.

2. *Scheduling reflection into the project timeline*

   It would have been useful to begin all the case study projects by making project risks explicit to each team member and referring back to those identified risks during key decision stages. We now believe that using the risk-tracking tool developed to analyze the case studies for this paper will help us to track and manage the risks better as a team.

REFERENCES

Fischhoff, B. 1975. Hindsight (does not equal) Foresight: the effect of outcome knowledge on judgement under uncertainty. *Journal of Experimental Psychology Human Perception and Performance*, 1.3, 288-299.

Greenwood Davydd, J. 1993. Reflective practice: a critique of the work of Argyris and Schön. *Journal of Advanced Nursing*, 18, 1183-1187.

Reece Jones, Peter. 1995. Hindsight bias in reflective practice: an empirical investigation. *Journal of Advanced Nursing*, 21, 783-788.

Schön, Donald A. 1987. *Educating the reflective practitioner: toward a new design for teaching and learning in the professions*. San Francisco, CA: Jossey-Bass, The Jossey-Bass higher education series.

AUTHOR NOTES

Joyce S.R. Yee is a practising designer, researcher and lecturer in visual communication at Northumbria University in the UK, where she completed a doctoral degree that focused on reframing how we understand typography in a digital environment. Earlier, she received an MA in Visual Communication at Central Saint Martins College of Art and Design. Her research is bound by a common theme of understanding how designers develop and improve their practice. She is interested in the areas of developing design-specific research methods, particularly human-centered research methods for design process and developing a knowledge-based approach to graphic design education in view of emergent media.

Matthew Lievesley is an Industrial Designer with an MBA from Northumbria University. His research is set in the context of commercial design practice, the complex world of competition, compromise, risk and pragmatics. His work has achieved international recognition in both industry and academia. In 2007, Matthew was selected by the UK's Design Council, the national strategic body for design, to support their flagship business engagement programme. This role complements his main work as Reader and Design Manager in the School of Design at Northumbria University. His portfolio includes national and international patents, journal and conference papers and designs for Boots, BT, McDonald's, Marks and Spencer, etc.

Louise Taylor studied Multimedia Design and completed an MA in Design Practice at Northumbria University and has been working as a designer in new media for the past eight years. She was previously a founding director of a design company specializing in the development of web solutions for business. Now based at The Centre for Design Research at Northumbria University, Louise's role encompasses branding, graphic communication, web and interface design with a strong focus on engaging end-users in the creation of innovative and enjoyable product and service offerings.