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21st Century Skills for Technical Communication

The sixth European Academic Colloquium (EAC) took place on April 26-27 at the University of Limerick in Ireland. For the third time, the Colloquium was integrated into the Erasmus+ project TecCOMFrame.

The European Academic Colloquium is an event that focuses on scientific content with respect to technical communication. It is targeted at members of the European scientific community who are teaching and doing research in the area of technical communication or related fields, such as translation, multilingual communication, localization, terminology, and information management. Since 2011, the EAC has served as a significant venue for the dissemination and sharing of technical communication research and practices in a European context.

The sixth EAC succeeded in bringing together 52 attendees from 10 European countries and the USA who share a common interest in the interdisciplinary field of technical communication. With this year’s focus topic, 21st Century Skills for Technical Communicators, the purpose of the conference was to provide a forum for an international audience to discuss the dynamic and fast-changing challenges and potentials of the technical communication discipline.

The morning session started with the inspiring keynote on “Adapting to the Future of Technical Communication” by Rachael Hewetson (SAP, Ireland). This was a good starting point for the day as she showed the industry’s perspective on which skills technical writers need in the 21st century. The keynote was followed by a presentation by Dr. Kirk St. Amant (Louisiana Tech University, USA) about cognitive design skills and how to create materials to meet the needs of the 21st century. Afterwards, Professor Sissi Closs (University of Applied Sciences Karlsruhe, Germany) and Dr. Jan Engberg (University of Aarhus, Denmark), who are both part of the TecCOMFrame project consortium, gave a presentation on “Flexible Information Models Based on Knowledge Frames and Topic-Based Structuring”. Another speaker in the morning session was Christiane Zehrer from Germany, who reported on how to acquire knowledge from subject matter experts with the project compass method. In the last presentation of the morning session, Parthena Charalampidou from the Aristotle University of Thessaloniki (Greece) talked about key competences for website localizers.
The afternoon session was devoted to the TecCOMFrame project, which had the task of developing a qualification and competence framework for academic technical communication studies and prototype curricula based on that framework. The TecCOMFrame project group presented its project outcomes including the prototype curricula they have developed. The audience showed a great interest in exchanging their experience and future trends in technical communication education.

In the remaining afternoon session, one Master’s student and three PhD students from the University of Limerick presented the current status of their projects.

We are proud to present this volume, which contains eight outstanding contributions, all dealing with the future of technical communication.

Rachael Hewetson takes an industry perspective on current and future skills needs of technical communicators. Sharing her experience at SAP, she describes “five behaviours” that have so far proven successful at SAP: *tell it like it is, stay curious, embrace differences, keep the promise, and build bridges, not silos*. Irrespective of how the field of technical communication will develop in the future, staying innovative, creative, and agile is of utmost importance. Hewetson states that companies are already experiencing now that there will be more value-added tasks requiring higher-level skills and an educated workforce, whereas more and more routine tasks (including content creation) are automated as a consequence of digital transformation. In an ever rapidly changing world, new management models emerge, which are based on trust and participation, and socio-economic skills such as empathy, social and emotional intelligence, and problem-solving become increasingly important. Agile software methodology is a case in point. Agile software companies are characterized by continuous delivery as well as iterative and incremental methods. People collaborate in teams, are open to and respond swiftly to change, and build future skills as required by the customer. Hewetson concludes her contribution by reviewing recent developments and activities at her company, SAP, such as migrating to a new content management system and working on conversational UIs with bots, while keeping the focus on producing excellent content.

Kirk St. Amant claims that today, design skills need to be modified to address the settings in which individuals access and use content. Thus, content must conform to context to be usable, i.e., the audience using it and the setting in which it is used. The challenge for technical communicators is finding approaches to help understand the dynamics of the contexts in which individuals access and use ma-
The solution involves addressing how an individual’s thought processes affect their design expectations and needs and how such factors affect the usability of technical communication products. Doing so requires understanding the cognitive processes affecting how audiences perceive and use different product designs. In his article, St. Amant examines how cognitive design, which uses cognitive models to identify and address audience design expectations, can help address such factors. These cognitive design skills can be important to career success for technical communicators and can be essential for revising technical communication education to prepare students for the workplace.

Sissi Closs and Jan Engberg propose an idea on how the combination of the theoretically based concepts of knowledge frames and topic-based structuring may lead to flexible information models which support technical communicators to implement and customize information products with reasonable effort meeting the requirement of cost-efficiency as well as the requirements concerning versatility.

Christiane Zehrer shares her vision on technical communication as a full-fledged and knowledge-based part of product development. In this view, the role of the technical communicator has evolved into that of an early advisor in product development. Traditional project management approaches, which separate product development from information development, no longer suffice to meet the rapidly changing requirements of complex software and service industry products. Instead, agile frameworks are needed to bridge the gap between cross-functional and possibly globally dispersed team members and their different perspectives. Product features are kept to a minimum. User stories have replaced the requirements in traditional approaches and help (re)contextualize project work by evoking everyday contexts. Furthermore, issue management systems and daily stand-up meetings are used to highlight the different stages of the work process. Finally, Zehrer presents the project compass as a tool for technical communicators and other project team members, which allows them to facilitate project communication and to actively engage in product development across the product lifecycle.

In her contribution, Parthena Charalampidou zooms in on website localization as a locus where translation and multilingual technical communication intersect. From the 1980s and 1990s onwards, scholars have emphasized the need to broaden traditional translational concepts and methodologies to include adaptation, rewriting, and recreation processes as well as multisemiotic and intercultural aspects. New forms of multilingual communication emerged due to technological advancement. As a result, the boundaries be-
tween source text and target text have blurred. Charalampidou argues that this development has led to an overlap of competencies of translators and technical communicators, both of whom are now multimedia communication experts. This is especially true of website localizers, who combine advanced technical writing skills in the target language with cultural knowledge and knowledge of hypertext. Based on her previous research on multilingual corporate and NGO websites, the author has identified multimodal literacy as the missing competence in existing competence models for localization, technical communication, and translation.

Gianni Angelini investigates current practices in web API documentation, more specifically the types and structure of its content, based on the analysis of eight web API references. While previous research has mainly addressed programmers’ needs from a usability perspective, Angelini discusses possible implications for technical communication, such as the application of writing techniques and the respective roles of API programmers and technical communicators. His research focuses on the use of the reference template (viz. components and labels of components, i.e. terminology) as well as on navigational aids (viz. the wording and sorting of headings, the presence of an index, and the availability of a search tool) and additional documentation sections in the reference (such as overviews and introductions). He found that in most cases the main template is used, albeit with customized variations consisting of additional information either in the form of new components or information added to existing components. Substantial variation was also observed with respect to terminology. Furthermore, interactive tools have proven to be commonly used in API documentation. Given the complexity of the task, Angelini favors a minimalist approach with the objective of developing a task-based strategy to API documentation, seeing expanding roles for technical communicators.

Margaret Grene reports on a user study with newly diagnosed asthma patients to test the hypothesis whether plain English in its outcomes-focused sense (Cheek 2010) can improve health literacy and medication adherence in Ireland. Grene first outlines how she has created a set of plain language step-by-step instructions for the use of an asthma inhaler, adhering to some basic principles of design. Second, she describes how the instructions were measured for their readability and comprehensibility using the Flesch-Kincaid readability check as well as proposition density. Third, the study incorporates feedback and reviews by academic and professional experts. Finally, the paper outlines how the study will test understanding of, and action based on, complex health information and procedures with the
intended user groups, viz. the general population, people with limited literacy, non-native speakers of English, and elderly people.

Elaine Walsh explores whether practices and techniques commonly used in technical communication can enhance the quality of assessment requirements, standards, and instructions in so-called assessment briefs for students in higher education. These practices and techniques include collaborative writing, instructional design with a focus on learning objectives, as well as single sourcing and information chunking to produce reader-centered, task-based, comprehensive, correct, concise, accessible, and consistent documents that are written in the right tone and that can be published in multiple versions and formats. Interviews with academic staff and students reveal that assessment briefs that are designed in accordance with the practices and techniques in question are positively received. Utilizing technical communication practices and techniques can help the assessment designer to become assessment-literate and boost confidence in students.

We wish to thank everyone who has contributed to the conference and the proceedings. First and foremost, our special thanks go to the conference organizer, Dr. Yvonne Cleary, and the speakers and authors whose papers are presented in this volume. Thanks are also due to all colloquium participants for their engaging discussions and insightful suggestions for the project. We want to thank the editors, and tkom Europe for its logistic and financial support. Finally, we are also indebted to the European Union for its financial support under Grant No. 2015-1-DE02-KA202-002278.

Antwerpen/Karlsruhe, October 2018
Birgitta Meex and Sissi Closs, on behalf of the Review Board
Adapting to the Future of Technical Communication

1 Introduction

This paper is an adaptation of the keynote speech delivered as part of the European Academic Colloquium on TC Studies 2018. It focuses on the skills, competencies, and other aspects that will enable those of us who work in the field of technical communication to adapt quickly and easily to change over the coming years. In some areas, such as in the software industry and at companies like SAP, where this author works, that change is rapid. So how can we best equip ourselves to deal with this, and what are the key things we need to bear in mind?

2 Skills and Competencies

Words you find used quite often are skills and competencies. What are skills and competencies, and which ones do we need both now and in the future? And indeed, is there anything else we need beyond these? The Oxford English Dictionary online tells us that a skill is “a particular ability” and that a competency is “the ability to do something successfully or efficiently”. If we apply that to technical communication at SAP, we can see that to write good user assistance (UA), you might need the skills to use a DITA-compliant content management system, for example. But you will also need certain competencies in order to make it really helpful. These include:

- Being able to communicate effectively with the subject matter experts to understand the complexity of the topic
- Breaking the relevant information down logically into smaller chunks
- Creating your UA in a way that will cater to the specific needs of your target audience.

Your ability to cater to all of these individual aspects well, and produce really helpful UA, are the competencies. However, regardless of whether we are talking about a skill or a competency or a behavior, what follows are some of the aspects that I think are important both today and in the future.
My premise is that we must look to the past to predict how things are going to be in the future. This is what weather forecasters do. They look to the past for weather patterns and apply these to future weather events. This is what we do in interviews when we are recruiting. We use the behavioral style of interviewing and we ask candidates how they handled a certain situation in the past. What they did and said in different situations in the past will give a good indication of what they would do and say if they were to find themselves in a similar situation in the future (Salgado and Moscoso, 2002).

And it is similar with the skills and competencies for technical communication in the 21st century. How do we figure out what is going to be important? My premise is that it makes less sense to focus on particular technical skills that we think might be required for future technical communication tasks, but rather to focus on what has served us well up until now and what will carry us into the future, including the behaviors and attitudes that will enable us to weather change.

When we recruit at SAP, we look for people with integrity, people who are dynamic and adaptable, people who are collaborative, creative and fun. Our CEO Bill McDermott’s message around this is clear: “We want people who have a passion for the customer. We want people who enjoy change and are constantly wondering how they can get better. And we want dreamers. If you do not have a dream for what you want to achieve in this world, you are walking around lost”. Retrieved from: https://www.sap.com/uk/about/careers/joining/ideal-candidates.html

3 Behaviors

What is of utmost importance for everyone in today’s world is to be able to stay innovative, creative, and agile. If we do this – if we find ways to keep our skills and competencies fresh on an ongoing basis, if we adopt the right attitudes and behaviors, we will be able to keep pace with innovation and we will be agile enough to guarantee our own future success in technical communication.

If we look at what is important in a company like SAP, we can find five behaviors that we have identified as being key to our success in everything we do.

- The first principle or behavior we promote is to tell it like it is.

Our software is designed for large corporations and can be quite complex. As technical communicators (at SAP we are called User Assistance (UA) Developers), one of our key roles is to be the advocate of the customer. We are among the first non-Developers...
who get to see and test the software and if we think it is too complex, we need to have that open and constructive conversation with our colleagues in Development and User Experience.

- The second principle is to stay curious. No one at SAP, or indeed anywhere, can ever sit back and say that they have finally learned everything there is to know. We have never-ending opportunities to learn and grow, and to develop our skills and competencies. The learning process should be never-ending and if we keep upskilling as we go along, we can ensure that we stay fit for the future.

- It is also important to embrace differences. At SAP we have over 90,000 employees in 150 countries. Staying innovative and creative will guarantee our future success and, in order to foster this, we need to ensure diversity and inclusion. One example of this is through generational diversity. At SAP we are proud to have 5 generations all working together. We must ensure our teams have a great mix of generations, whether Traditionalists, Baby Boomers, Gen X, Millennials, or Gen Z. We also believe that neurodiversity is key to fostering diversity and inclusion. I have been lucky enough to be able to work with my team in Galway to support SAP’s Autism at Work initiative. The people who have worked in our team and who are on the Autism spectrum have brought amazing creativity to the table when it comes to making videos and graphics for our UA. For more information, see: https://www.sap.com/corporate/en/company/diversity/differently-abled.html.

- A fourth principle is to keep the promise. We need to stay close to our customers to ensure we are delivering the UA that they need.

- Finally, SAP encourages employees to build bridges, not silos. There are many different groups at SAP who are involved in the software lifecycle. We need to collaborate with each other on a regular basis to ensure that our UA is as good as it can possibly be. Examples of this include collaborating with our User Experience colleagues to ensure an optimum UI and with our Product Support colleagues to ensure we are catching customer issues up front. All these behaviors will stay relevant no matter what shape technical communication takes in the future.

4 Digital Transformation

If we jump ahead to get a sense of what shape the future is taking, we can see that the world as we all know it is transforming rapidly and we are right in the middle of the digital transformation. It would be
easy to perhaps be somewhat fearful of these changes and what they might do to our jobs and our tasks as we know them. Dr. Guenter Pecht-Seibert at SAP in Germany has been doing a lot of research on this topic. According to his findings, we are already experiencing that there will be more work requiring higher-level skills. Bruckner et al. (2017) write that past technological revolutions including mechanization, electrification, and computerization all radically reshaped work, jobs, and the organization of business and society. From each revolution, new jobs emerged and the same is happening now. In 2017 the German Federal Ministry of Labor and Social Affairs reported that by 2025 the digital transformation will eliminate 1.5 million jobs in Germany but at the same time generate 1.5 million new jobs.

Regardless of what transformations and revolutions will take place, new jobs will arise that will need new levels of skills and that will leverage uniquely human qualities. In a policy brief on the future of work, the OECD (2016) outlined the importance of socio-emotional skills going forward. These skills include empathy, social and emotional intelligence, and the ability to set context and to define business problems. When routine tasks are automated, people will have more time to spend on value-added tasks, like serving customers and solving complex problems by collaborating with other people. We will see a tremendous increase in knowledge workers and companies will have to focus on acquiring talents and educating their existing workforce to meet the upcoming challenges.

With this digital transformation, we are also seeing the speed of innovation increase as never before. Writing for the Irish Times, Charlie Taylor (2017) reports that the average lifetime of the Fortune 500 companies has dropped from 75 years 50 years ago to 15 years today. According to Capgemini Consulting (2015), since 2000, 52% of the Fortune 500 companies have either experienced bankruptcy, been acquired or have gone out of business entirely. Whether you like it or not, the pressure to innovate and to re-invent yourself again and again is high – of course all of this without compromising your day-to-day tasks.

5  Fostering Innovation

The new paradigm for companies is no longer just efficiency. In a world where everything that can be automated is automated, efficiency is no longer a key differentiator. In an ever-faster changing world, companies have to learn to become innovative and agile to survive and stay competitive (Mathiassen and Pries-Heje, 2006). And it is no different when it comes to technical communication. The way that
Adapting to the Future of Technical Communication

you set up the organization within a company is very important for fostering this innovation and agility. Down through the years companies have organized themselves to handle the transformations going on at the time. Traditionally, companies have top-down hierarchical, functionally divided organizational structures and principles. The main management principle is command and control. Managers tell their subordinates what to do, even how to do it, and measure the achievements and performance.

This worked well in the past, for example in the early part of the 20th century, when we had a low degree of automation, a sometimes poorly educated workforce doing manual tasks and often ill-informed customers in stable mass markets. The main goal of the companies at that point in time was scalable efficiency. These hierarchical management systems and practices worked very well under those conditions. Happily, things are different today. We have a highly educated workforce, we have well-informed customers and – as a result of digital transformation – we are experiencing a degree of automation like never before. Companies can no longer differentiate through scalable efficiency. Their additional goal now is to become innovative and agile. It is obvious that we cannot respond to these new challenges with the traditional management system.

Companies that have realized this have implemented a management system of self-directed networked teams and implemented a leadership style based on trust and participation. In a more and more complex and unpredictable world, collaboration among experts becomes mission-critical. And this is good news. Writing about the future of work, Guenter Pecht-Seibert (2018) notes that as more and more routine tasks are automated, people have more time to deal with more complex challenges. Released from procedural and transactional tasks they can focus on more explorative and complex tasks.

We see this in the Agile software methodology, where software is developed from the ground up by scrum teams. Technical communication is an integral part of these teams of ten. From the earliest part of the software lifecycle, UA Developers work together with their Developers, Product Owners, and UX colleagues to take in customer requirements, design great UA, and continuously deliver and improve in many iterations. They stay close to Product Support to make sure that any issues the customers might be having are dealt with up front as far as possible in the UA.

To see how such automation might affect technical communication, we can take a look at a tool developed by McKinsey & Company on the Time Magazine website (http://time.com/4742543/robots-jobs-machines-work/). If we look at the role of technical writing, we
can see that – according to this tool – 42% of a technical writer’s job could be done by a robot. We can see from this that the robots can take over some aspects such as compiling and writing information, maintaining documents and reviewing technical specifications. However, the areas still considered to be “safe” from the robots are skills and competencies such as coordination, conferring and collaborating, drawing, designing, editing and researching. So, this is good news for all of us humans with the right skills and competencies!

6 UA Transformations

Within UA at SAP, we are well on the way with this digital transformation. With each new technological advance, both in SAP software and in the tools we use to create our UA, we need to update what we deliver; who we deliver it for; how, when and where we deliver it.

We can see some examples of this if we look at some of our tasks over the last few years at SAP. In recent years, we have migrated all of our help content from our proprietary content management system Knowledge Warehouse to a new DITA-compliant content management system. This involved migrating the work of over 500 authors and translators. It took roughly two years over the course of which nearly 1.7 million objects were migrated into the production system, distributed across 270 products encompassing almost 700 releases, each of which counted as a separate migration project. All UA Developers had to learn the new system, Ixiasoft, and also the new scope of their responsibilities. They have far more speed, flexibility, and autonomy around publishing, but more complexity to deal with in terms of the architecture and structure of setting up and maintaining the documentation set.

As a second example, many of SAP’s applications are available in on-premise, standalone, and cloud versions – each with its own set of UA. As each product transitions to the Cloud, the UA Developers continue to deliver the UA for the on-premise and standalone versions, while at the same time plan for the new cloud version and:
- Upskill themselves on the new tools (SAP Enable Now Web Assistant)
- Think about the new target audience (for example, end users)
- Plan new types of deliverables (feature scope descriptions)
- Move to the continuous delivery schedule of the cloud software, for example every 2 to 4 weeks.

We deliver a comprehensive range of UA assets tailored to the technology we are working with and to the respective target audience. Not all types of assets will suit a particular product, and the decision
regarding which types of assets are most helpful for the customer is made between the UA Developer and the Product Owner. Once the basic, legally required UA is in place, each product area can then decide what constitutes the most helpful and effective UA for their customers. This gives each UA Developer great autonomy when it comes to the UA being delivered for that product. This works because each UA Developer is an integral part of the scrum and they are working closely with Product Owners and Developers right from the beginning to define terminology, work on the UIs and plan the other assets in line with customer requirements.

If you would like to see more information about some of SAP’s UA, you can visit the following resources:

- You can see an example of the in-application help that we embed into some of our applications using SAP Enable Now Web Assistant here: https://www.sapfioritrial.com/.
- You can see the UA we have published for our products by going to SAP’s Help Portal here: www.sap.help.com.
- You can see how we define terms and write glossary entries by visiting SAP’s terminology database here: www.sapterm.com.

Having a comprehensive and up-to-date terminology database is vitally important for ensuring clarity and consistency across the many languages into which we translate our software.

7 What Does the Future Look Like?

The world is moving more and more towards automated content creation. According to the MIT Review (2017) a news automation system, Reuters Tracer, currently deployed at Reuters News Agency, covers about 70 percent of news stories with 2 percent of Twitter data.

At SAP we are working on conversational UIs. Using SAP CoPilot, users can chat with our digital assistant for businesses to ask questions and give commands. SAP CoPilot contextualizes, analyzes, and uses informal and unstructured speech to execute actions and present users with business objects, options, and other relevant data in a simple and conversational way. For more information, see: https://www.sap.com/products/leonardo/machine-learning.html#conversationalai

In the UA teams at SAP, we are working with Development to train these bots. The experience of our end users with these bots needs to be frictionless. Friction arises from poor conversation with a bot, where a bot does not really understand what an end user is looking for or what is required. And who better to train these bots...
than technical communicators! We have excellent natural language skills and, as such, are best placed to train the bots to be able to have high-quality conversations with our end users. We are good at smart conversation, we understand our end users, we can empathize with them, and we know their language. This is one key area where we will be applying our current skills and updating other skills in the future.

Other areas to build future skills in are content curation, expertise in web technologies, social media evolution, marketing and analytics (including how to create engaging videos and stories), and a deeper understanding of the type of AI that is available for creating content. Technical communicators globally should always keep the focus on producing excellent content. This is what drives rankings. Search Engine Optimization shows us that rankings go up if content is shared in social media channels and if other websites link to it.

How and where that content is used is also important and this is where we need the skills to ensure it can be used in different ways, depending on the purpose we need it for. If we take the example of a customer experience web site for SAP Cloud Analytics (https://www.sapanalytics.cloud/learning) we can see that some of the information on this site is based on content originally developed by UA. However, it has been redesigned to better fit the new audience or purpose. This is an example of how UA deliverables can be included in this kind of mash-up of content that gets rebranded and repurposed for other needs. Therefore, UA Developers need to remain adaptable and flexible in terms of the type of content they create (videos, images, interactive tutorials, etc.) and the audience for whom they create it.

8 Conclusion

This paper has looked at some of the skills and competencies that are important today and which ones may be important in the future. The conclusion is that it can be hard to predict too far into the future some of the more technical skills that may be required, as change can be rapid and sometimes unforeseen. What is far more beneficial is for people to foster their sense of curiosity and willingness to learn, so that they can keep up with change and are then best placed to turn their hand to whatever is coming along next. As long as we are curious, open to change, willing to turn our existing skills to new tasks, and develop new skills as required, then our future as technical communicators is bright.
9 References


1 Introduction

Usability involves addressing the mental models individuals use to process information in different settings. If technical communicators can understand such models, they can create materials that are easier to use. Cognitive design is a process for addressing such dynamics. The cognitive design framework guides the process of collecting and applying data on how individuals evaluate the usability of designs in different settings. Technical communicators can use this information to develop products that better meet the cognitive aspects individuals associate with usability in different contexts.

This entry introduces technical communicators to the cognitive design process. The first part of this entry summarizes the cognitive factors that shape the expectations individuals associate with usability in a setting. The entry then explains how these factors can guide research to identify user expectations based on these mental models. This same section also describes how technical communicators can use such cognitive information to develop new materials for and test initial designs with intended audiences. Through this structure, the entry reveals how technical communicators can apply the cognitive design process to develop materials that meet the usability expectations of different groups.

2 Cognition and Usability

Usability involves factors that influence how individual use materials to perform an activity to achieve an objective (Nielsen Norman Group, 2014). The challenge is identifying what those factors are and how to best address them. Doing so requires an understanding of cognitive aspects affecting expectations of design and use (St.Amant, 2017).
2.1 Cognition, Identification, and Use

Prototypes are the mental model we use to identify objects and determine how they are used (Rosch, 1978; Aitchison, 1994; St.Amant, 2017). When we encounter a new item, we scan it quickly, and our brains compare that item to a catalog of prototypes we have for all of the different kinds of objects we have encountered. If that new item has enough features in common with a particular prototype (i.e., representation of what we think something should look like), we will identify that item accordingly (Rosch, 1978; Aitchison, 1994; St.Amant, 2017). So, if a new item has enough features in common with our prototype for “pen,” we will identify it as a “pen.” If not, we will determine it is not a pen, and continue comparing it to other prototypes until we identify what it is.

In addition to physical characteristics, prototypes often include properties associated with an item (Rosch, 1978; Aitchison, 1994). Such properties encompass everything from the traits the item has (e.g., ice is cold), abilities of the item (e.g., birds can fly), or associated uses (e.g., pens are used for writing). Such factors have important implications for usability and design (St.Amant, 2017). If, for example, a new item does not match the prototypes in our mental database, we could misidentify (or fail to identify) that item and misuse it or be unable to use it. Such mismatches explain why individuals often cannot identify what new items are, to determine how to use them. This factor can apply to overall items (e.g., not being able to identify a mobile phone) to specific features on an item (e.g., being unable to identify the “text message” feature on a mobile phone).

Prototypes form through experience (Rosch, 1978; Aitchison, 1994). The more often we encounter a “pen” that looks a certain way and is associated with doing certain things, the more those factors shape our prototype for “pen.” Such factors also reflect the contexts where we’ve encountered items over time. Identifying such contextual factors becomes central to understanding how we recognize items and assess the usability of their design.

2.2 Cognition, Context, and Usability

The locations where individuals perform processes affects cognitive models for how to perform activities. Each setting contains different objects that can help or hinder with a task. Similarly, where one performs an activity affects who might be there to help. These factors influence how individuals use items in a context of use — or setting where individuals use materials (Petroski, 1992; Otto & Smith, 2013; St.Amant, 2017). They also shape mental models for assessing the usability of designs in a space.
As with prototypes for objects, repeated experiences lead the brain to form cognitive models of the places where individuals perform activities. Known as *scripts*, these models contain information about where individuals perform an activity (Tompkins, 1978 & 1987; Schank & Abelson, 1977). These models also contain information on what items individuals expect to use – and how – and who participates in activities in that space.

When individuals perform a process, their mind accesses the script for where they engage in that activity. That script provides a template for what to do in that space (Tompkins, 1978 & 1987; St.Amant, 2017). These scripts also provide information on the materials individuals expect to find in that space in order to complete an activity (Tompkins, 1978 & 1987; Schank & Abelson, 1977). If such items are missing – or if the activity takes place in a context with different items – users have no cognitive models to guide their actions. Similarly, if individuals perform an activity in a new space – one for which they have no script – confusion often results. This is because there is no mental model to guide actions in that location.

### 3 Creating Cognitive Maps

Usability is about matching product design to user expectations (Nielson Norman Group, 2014). Doing so involves identifying those expectations, understanding how they influence perceptions, and using this information to create designs that meet – or map onto – such expectations (Garrett, 2010; Hassenzahl & Tractinsky, 2006; Buxenau & Suri, 2000). Technical communicators can combine ideas from prototypes and scripts to guide how they create cognitive maps of user expectations.

#### 3.1 Mapping Contexts of Use

Understanding prototypes and scripts can help technical communicators create materials that better meet user expectations. They do so by identifying how users’ minds recognize and respond to designs (St. Amant, 2017). Essentially, these tools help designers map (i.e., identify and organize) the variables individuals associate with usability in certain contexts of use. Such maps identify the cognitive models individuals associate with usability for different items (what something should look like) and in different contexts (how individuals should use items).

Once this mapping process is complete, one has a guide/map to follow when designing usable materials for those users (St.Amant, 2017). Ideally, such maps parallel what the mind associates with use.
and usability in a setting. Accordingly, maps of users’ cognitive structures can help technical communicators design items that seem inherently usable to an audience. Technical communicators can then use these maps to guides what features an item should have and where that item should appear so individuals effectively identify and use it. The objective is to design items users can readily identify and use.

While context maps are beneficial tools, creating them is time-consuming. Interviews, focus groups, and ethnographic research allow one to collect large amounts of information on users’ cognitive models for prototypes and scripts. Sifting through that information is cumbersome, for not all of the data one collects connects to such models. For this reason, approaches that help focus the collection or the identification of information relating to cognitive models can facilitate such processes.

3.2 Understanding Cognitive Maps
Cognitive design involves a focused research approach based upon using a particular process to identify the cognitive models individuals’ minds associate with usability in a particular context. We can then use such data to guide how we design materials for a particular group of users.

Ideally, such data effectively maps out the expectations individuals associate with usability in a setting. Technical communicators can use such data to map out designs that effectively match those expectations and build a more complete understanding of user expectations based on this information. This approach is cognitive mapping – identifying (or mapping out) the mental models associated with usability expectations in a context and using this information to guide (map out) the design of materials for such context. Cognitive design focuses on creating such maps for different groups of users and using them to develop materials that reflect (map onto) user expectations.

The approach begins with collecting data on cognitive models directly from users by asking them about their expectations associated with how to do a given task. In cognitive design, the questions used in such activities focus on identifying the specific scripts and prototypes those individuals use to shape their expectations of what to do in a context (scripts) and what items in that context look like (prototypes). Technical communicators also need to ask for this information in a particular order to access the correct cognitive models that influence expectations in a context of use.
4  Methods for Mapping Contexts of Use

Mapping users’ cognitive expectations involves focused, systematic data collection, analysis, and testing to create usable designs. Doing so encompasses the use of certain research questions, related data collection methods, and systematic design and evaluation processes. If technical communicators understand and can address such factors, they can create materials that better meet the cognitive factors individuals associate with usability in various contexts.

4.1  Guiding Cognitive Questions

To identify cognitive models for context of use, technical communicators need to have users answer the following questions:

▪ When do you usually do [specific activity]? – Isolates when users perform an activity.
▪ Where are you when you try to do [specific activity]? – Establishes where users engage in the activity at the time when they perform it.
▪ What do you use to perform [specific activity] in [location at this time]? – Identifies contextual variables affecting what users do and how they use items in a context.
▪ How do you use [variables associated with context] to perform [specific activity]? – Clarifies how the variables in that context affect what individuals expect to do – and how/with what – in that context.
▪ What does that item look like; describe it to me. – Notes the prototypes individuals rely on to identify the objects used to perform an action in that space at that time.

Technical communicators need to ask these questions in this order, for doing so helps identify the cognitive models users have for certain contexts of use.

When users perform activities in a space could also mean other individuals are in that space to help with – or affect – how users perform activities. Data collection on cognitive expectations needs to address such variables. Doing so involves technical communicators asking users to respond to these additional questions:

▪ Is anyone else in this space at this time? – Determines if others are in that space at that time.
▪ Who are they? – Establishes if these individuals influence what users do in that space at that time.
▪ How do you know who they are? – Isolates those factors used to identify the individuals users expect to encounter or work with in a space at that time.
• What are they doing? – Identifies if these individuals contribute to or affect how users perform an activity in that space at that time.
If individuals help with the process the user is performing, technical communicators must also ask
• What do these individuals use to perform this process? – Clarifies the factors/variable associated with performing a process in that space at that time.
• What do these items look like; describe them to me. – Identifies the prototypes individuals employ to identify the objects others use to perform an action in that space at that time.

These questions help map out the scripts users rely on to guide what they expect to do in a given context at a particular time. They also help identify the prototypes users rely on to recognize the items they expect to find – and to use – in that space at that time. The responses to these questions provide technical communicators with the information needed to understand the dynamics affecting usability expectations in this context of use. Technical communicators can then use these factors to create a relatively comprehensive model – or map – for how users conceptualize a particular context of use. They can then use this map to guide how they design materials for that context.

4.2 Cognitive Design Process
The cognitive design process involves four phases in which technical communicators collect cognitive data on contexts, use that data to guide design practices, and test and revise such designs based on user feedback. These four phases of cognitive design are
• Establishing contextual expectations – Identifying the specific cognitive model used
• Determining design expectations – Identifying variables that are part of the cognitive models individuals have for a context of use
• Designing for context – Using the data on users’ cognitive models to guide design practices
• Testing initial designs – Determining how effectively initial designs reflect users’ expectations of context of use

The first two phases of this process involve identifying the cognitive models users associate with performing an action in a context of use and build an initial cognitive map. The third phase focuses on how to use this cognitive map to create draft designs that seem to address expectations of context of use. The final phase involves examining how effectively this initial design – and the related cognitive map upon which it is based – reflects users’ expectations for a context of use.
use. Each phase focuses on certain questions for collecting or using particular cognitive data users associate with a context of use. Each phase also uses a particular method for collecting or applying data in relation to cognition and usability expectations. These phases take place in a particular order and involve certain approaches described in section 4.3.

### 4.3 Phases of the Mapping Process

Each phase of the cognitive design process focuses on a particular guiding objective and particular method of collecting or applying user data. The goal of each phase is to identify – or map – the cognitive expectations users associate with a given context of use and test and refine such maps.

#### Phase 1: Establishing Context for Design

This initial phase focuses on collecting data on the cognitive models users associate with the overall context of use where an activity takes place. This phase involves the following factors to guide data collection on cognitive models from members of the related user group:

<table>
<thead>
<tr>
<th>Focus/Objective</th>
<th>Guiding Research Questions</th>
<th>Method of Data Collection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial data collection done to identify the context of use</td>
<td>• When do you do X? (Script identification) • Where do you do X? (Script identification)</td>
<td>• Questionnaires • Surveys • Interviews</td>
</tr>
</tbody>
</table>

This phase identifies the context of use where individuals expect to perform an activity and for which they have created mental models (i.e., scripts and prototypes) for expectations of usability in that context.

#### Phase 2: Identifying Variables of Design

Once information collected from Phase 1 identifies the context of use, the next step is to identify the variables affecting usability in that context. This second phase addresses this objective through collecting data on two cognitive factors:

- What objects or individuals users expect to encounter in and to use or to help with performing activities a context of use. (Scripts)
- What features users rely on to identify the objects and individuals associated with performing activities in that context of use. (Prototypes)
As with Phase 1, Phase 2 involves using certain factors to guide data collection on cognitive models from members of the related user group:

<table>
<thead>
<tr>
<th>Focus/Objective</th>
<th>Guiding Research Questions</th>
<th>Method of Data Collection</th>
</tr>
</thead>
</table>
| Identify variables (items and individuals) associated with usability in a given context of use | • What/who is there/in that context? (Script identification)  
• How do you know what/who it is? (Prototype identification)  
• What materials do you/they use in that context to do X? (Script and prototype identification)  
• How do you/they use these materials in that setting? (Script and prototype identification) | • Interviews  
• Focus groups |

This information helps establish the cognitive elements technical communicators need to address and how they need to be designed for a context so users can

- Correctly identify expected variables – whether they are objects or individuals
- Easily know how to use them (objects) or work with them (individuals) to perform an activity in that context

Technical communicators can use information collected from Phase 1 and Phase 2 to create an initial cognitive map of what users expect to do, how, and with what (or whom) in a particular context of use. Technical communicators can then employ this initial cognitive map to guide the preliminary design of materials for that context of use. Ideally, such designs map onto the cognitive expectations of users, and users, in turn, perceive such designs as usable.

**Phase 3: Designing for Context**

In this phase, the focus of the activity is mapping initial designs – or using cognitive data on users to map out the design of initial materials for a given user group. Again, the overall process centers on achieving a particular objective and is guided by certain questions. This time, however, the questions guide how technical communicators apply data to create draft materials. The methods used also re-
reflect the creation process and focus on using data to develop initial designs. The process involves the following dynamics:

<table>
<thead>
<tr>
<th>Focus/Objective</th>
<th>Guiding Research Questions</th>
<th>Method for Creating Initial Materials</th>
</tr>
</thead>
</table>
| Developing designs that meet user expectations of context of use and are usable (i.e., readily recognizable and easy to use) | • What should technical communicators make/design to meet user expectations for this context of use? (Application of script and prototype data)  
• How do technical communicators design specific objects and their particular features so they are easy to recognize and use? (Application of prototype data) | • Wireframing (creating initial sketches of a design/item)  
• Beta version development (creating an overall sample item/product) |

The objective of this phase is to produce an initial mapped design (e.g., a wireframe or beta version) of a product based on the cognitive maps developed from user data. Technical communicators would next test these initial designs with members of the relate user group to assess how effectively these designs match users’ cognitive expectations for context of use.

**Phase 4: Testing and Refining Contextualized Designs**

In this final phase, technical communicators test the initial mapped design by having users review it and – ideally – try using it to achieve a particular objective. The goal in this phase is to observe user responses to and uses of this initial design. Technical communicators can use this process to determine how well the initial design maps onto their expectations of use as well as if a design – and the cognitive map used to produce it – needs modification. This process works as follows:
Technical communicators can use the data collected during Phase 4 to assess how well an initial design meets user expectations of a context of use. They can then use the data collected from these processes to revise this initial design in order to better address user expectations. These revised designs should be tested again with users to determine how well they meet user expectations of context of use. This iterative process of assessment, revision, and retesting would continue until a final, effective/usable design is achieved based on user feedback.
5 Revising Cognitive Maps

Technical communicators can use this assessment process to determine if the cognitive maps they created need revision to better mirror the cognitive models of users. They can then revise these maps to create tools that allow for more effective/usable designs for a particular setting.

It should be noted that the cognitive factors users associate with the design and uses of a product can shift over time as technologies evolve and societies change. The cognitive maps technical communicators use to guide designs therefore also need to be revised to address such changes and to remain effective tools in the design process. For this reason, it is important to regularly test these cognitive maps with a given user group to determine if these maps need to be revised to better reflect user expectations of a context of use.

6 Concluding Thoughts

An old saying claims “form follows function.” The idea is the design of an item inherently reflects what it does. A hammer, for example, is shaped a certain way so it can perform certain tasks. The problem with this view is the functionality of a form is dependent on where individuals perform an activity. The cognitive design process can provide insights into these dynamics and help technical communicators create materials that match expectations of usability individuals have for a setting.

Through mapping cognitive models, the cognitive design process helps technical communicators create products that reflect the forms individuals associate with usability in a setting. In this way, the cognitive design process can lead to the designs of materials (i.e., content) that conform to cognitive expectations of context. Thus, when it comes to cognitive design, the adage guiding design shifts from “form follows function” to “content conforms to context.”
7 References


Flexible Information Models Based on Knowledge Frames and Topic-Based Structuring

1 Introductory remarks

Bread and butter of any company doing business in the field of technology is to be aware of innovations in the field itself and in neighboring fields. The idea is to always be aware of developments in order to assure that the position of the company may be secured and that the company avoids being left behind when the rest of the field moves on. The prominent role it plays for modern-day business means that the concept of innovation has grown into a real fashion word that no company profile can do without.

What is correct for the field of business also applies for the field of specially applied research, perhaps even more acutely: the actual raison d’être for applied research is to create new insights and make discoveries that may support innovative approaches to the solution of problems in different parts of society’s life. Our contribution here is a case in point: Based upon our respective research interests and studies performed by us and by other researchers, we suggest an innovative way of thinking about the production of content in technical communication. The innovation lies especially in amalgamating the idea of precise and correct rendering of the technical content traditionally central to technical communication with ideas of image-building traditionally more related to the field of PR and corporate communication.

Before we present the research results supporting the innovative approach, however, let us dwell briefly upon the meanings of the concept of “innovation”. Its position as one of fashion has, as is normal, led to a certain blurriness of the concept. In other words, because the word is used so frequently, in different settings and in order to justify different activities, it may mean different things. From the field of research into innovation, one distinction in particular is relevant in the context of this contribution, viz., the distinction between radical and incremental innovation:
A radical or disruptive innovation is an innovation that has a significant impact on a market and on the economic activity of firms in that market. This concept focuses on the impact of innovations as opposed to their novelty. The innovation could, for example, change the structure of the market, create new markets or render existing products obsolete. 

Incremental innovation concerns an existing product, service, process, organization or method whose performance has been significantly enhanced or upgraded. This can take two forms: For example, a simple product may be improved (in terms of improved performance or lower cost) through use of higher performance components or materials, or a complex product comprising a number of integrated technical subsystems may be improved by partial changes to one of the subsystems. (our italics)

https://www.innovationpolicyplatform.org/content/radical-and-incremental-innovation

Much of the innovation found in business settings is incremental. This makes sense, as it means that companies are constantly looking to enhance their procedures and excel in their field, thus securing the position and excellence of the company. A recent example of this kind of incremental innovation in large scale is the development of so-called intelligent information based upon deeply structured standardized metadata (cf. tekom’s iiRDS project https://iirds.org/). This innovation is highly relevant, as it helps in solving the challenge of how to take better advantage of machine-based handling of procedures in communicative settings. However, the innovation is incremental rather than radical in the sense that it refines existing handling procedures mainly based upon the possibilities that modern computer power has generated. On the other hand, it is our claim that the possible innovation we want to present here is of a more radical kind, as it intends to include new perspectives in the way we see technical communication in the traditional sense and thus change the thinking about this type of communication. This division of labor between business and academia is highly sensible: incremental innovation may be time- and money-consuming, especially at the scale of projects like the one mentioned above. However, the outcome is fairly secure, as no new basic insights are involved in the development. Hence, it is well placed in the sphere of business. Radical innovation, on the other hand, is basically an insecure venture, as it involves, for instance, including perspectives not yet tested to be relevant for a process, but thought of as being relevant based on research insights. These contextual characteristics make it relevant to place the initiative for such innovation in the sphere of academia, to which we both be-
long. Whether the ideas will actually be fruitfully taken up in practice is still uncertain. In the remainder of this contribution, we will make the case for this to happen.

2 Underlying research question

The basic research question and at the same time real-world challenge that we have taken up here is how a company may work on improving trust in itself and its competences in today’s digital world. Research into trust has shown that at least interpersonal trust, which is the central root of the concept of trust, is largely built upon personal experiences with the object of trust, the trustee. However, the digital world lacks the actual personal experience of the potential trustee, on which we regularly base our feeling of trust. Instead, we have to rely fully upon the communicative efforts of the trustee in order to collect enough clues to establish a relationship of trust. In business settings, one of the central aspects in order to establish trust is the aspect of expertise of the actual or potential cooperator (Holtzhausen & Zerfass, 2015, 12). Based upon the communicative efforts of the cooperator, the trustor must be convinced that the trustee company is actually good at what it is doing and therefore deserves our trust and is worth the trustor’s cooperation.¹

We suggest including the perspective of trust and trust generation based upon expertise in the practice of traditional technical communication. To this end, we will present considerations centered around the following two research questions:

- Can we construct a model of trust generation through expertise perception and thus find objective criteria for the expertise-generation potential of an information product?
- How can we improve information products based on these rules using topic structure and iterative optimization?

3 Criteria for expertise-generation potential

The basic analytical approach here is that of frame analysis in the form applied in Engberg (2009). A frame may be defined in the following way with reference to our topic:

By the term ‘frame’ I have in mind any system of concepts related in such a way that to understand any one of them, you have to understand the whole structure in which it fits; when one of the things in

such a structure is introduced into a text, or into a conversation, all of the others are made available. (Fillmore, 1982, 111)

Frames are thus seen as models of the conceptual network structures in long-term memory that function as a basis for understanding. The basic assumption is that with texts (written, spoken or in any other semiotic format), communicative partners try to govern the processes of understanding the other by tipping off parts of a frame intended to occur as specifically central. So although, as Fillmore states in his definition, the assumption is that the introduction of any part of a frame into conversation will make all other aspects available, via the textual structure and the choice of elements from the frame we can give prominence to specific elements in the mental model constructed by the other in a conversation.

The analysis of information products based on a frame approach investigates two things:

- Which parts of a concept are expressed textually and thus occupy a profiled position in the content structure represented in a text?
- Which parts of a concept are merely presupposed, thus occupying a less profiled position?

How does this general concept of the process of understanding team up with the idea of generating trust in the expertise of the sender of the information product? The hypothesis behind it is that when making these structured choices, a sender may demonstrate expertise through a choice of elements from the frame that demonstrates the knowledge profile of an expert. For instance, the analysis in Engberg (2018) of a product brochure for expert customers shows the following characteristics:

- Frequent use of non-explained terminology (= relying upon presupposed expert knowledge of the reader).
- Focus upon aspects of functionality relevant for expert user (= adapted to information needs of receiver).
- Neglecting internal mechanisms without relevance for the purpose of the products in the context of the target experts (= adapted to information needs of receiver).

This kind of textual strategy is different from actual advertising or explicit communication of the image of a company as it is done for instance in the “about us” section of company webpages. Instead, it is related to what is known in the context of PR as Content Marketing (Hilker, 2017). The idea is to attract potential customers by talking about specific topics in a way that demonstrates the relevance of being in contact with the sender. In our case, the idea is to demonstrate by expressing specific elements and leaving others for inference
that the sender knows enough about the concept to communicate expertly about it. In this way, the criteria developed here are relevant as guidance for technical writers working on the architecture of an information product.

4 Designing the information architecture

To have a solid basis for implementing and further developing information products, we need models with which ideas are made explicit, understandable, and verifiable. Suitable models enable exchange and communication and allow for iterative optimization. To find adequate models, proven methods from technical communication can be used together with the frame analysis approach specialized for a certain purpose such as generating trust through digital content.

4.1 Topic-based structuring

To gain both flexibility and efficiency, topic-based structuring is the structuring method of choice for content creation and delivery. The basic idea of this structuring principle is the division of content into pieces known as topics with the aim of assembling and reusing them flexibly (Closs, 2011).

A term definition is a good topic example. A term is defined only once. Its definition can then be used anywhere where the term occurs and an explanation is needed.

As this example shows, a topic should be a self-contained piece of content, as context-independent as possible, containing a key statement and making sense on its own. The division of content into topics can make sense for many reasons, e.g. to be able to deliver exactly the content the user needs in a certain situation or to address a special target group. Also, technical and organizational reasons play a role for a modularization concept. There are no rules governing the size of a topic. However, a topic should not be too large but large enough to contain meaningful content that can be properly managed.

The topic-based structuring principle has a long history. It was already used in classical book production for lexicons and glossaries, but really came to life when content could be created and displayed digitally, and when important functions, in particular linking, could be technically implemented in an effective manner. Thus, topic-based structuring has flourished since the arrival of graphical user interfaces and online help for software. Methods and tools were developed both to support the creation of topics and to improve the user experience. With DITA, a well-established XML standard has existed for
nearly 20 years, offering a largely tool- and manufacturer-independent XML basis for the topic sources (OASIS, 2018).

From a pool of topics, information products can be formed flexibly for different purposes and output formats whereby the same topic can be reused whenever needed. This is often compared to the Lego system. Just as you can use Lego bricks to build the most varied houses, cars, and landscapes, you can create all sorts of information products from the same repertoire of topics. In addition, topic-based information products can easily be changed by just altering, adding, or deleting single topics without having to create a completely new product. This allows for continuous optimization and keeping information products alive.

Topics and their relationships to each other are, however, a challenge regarding their management because the number of pieces can grow very fast. To avoid chaos, topics and their relationships must be classified and assigned to a small number of suitable topic and link types. These types in turn must be clearly characterized and defined. They then serve as models for controlled topic creation and maintenance, and ensure uniformity and consistency.

4.2 Defining types with the Class Concept Method®

The design of topic and link types is a central task for information architects (Closs, 2014). The Class Concept Method® helps to iteratively design suitable topic and link types with appropriate classification criteria and to adapt the types if required (Closs, 2011).

Depending on the overall content strategy, suitable classification criteria must be defined. Known classification criteria for technical communication are based on modeling methods such as information mapping or functional design, but also consider the technical possibilities. For example, content is modularized in a way that topics can be presented using speech or video.

For the purpose of trust generation, further classification criteria must be defined. It is particularly necessary to consider the user’s skill level when classifying the content. Here, modern didactic methods should also be taken into account that do not consider education to be purely “conveying stuff” but as a process of developing creative and operational competencies. In addition, methods from other disciplines, especially interaction design, can be considered. An important technique for topic-based structuring is progressive disclosure. This is an interaction design technique that sequences information. Originally coming from software usability, the technique can be used for any kind of digital information delivery. User interface experts Carroll and Rosson used progressive disclosure for effectively providing
5 Agile development

Using an iterative and agile development process, the information architecture can be adapted and iteratively optimized as needed. Content that is produced and delivered on the basis of topic-based information architecture can be continuously reworked in an efficient manner. As more results of the user’s behavior and expectations are won over time, single topics or whole topic layers can be adapted, exchanged, or added as needed to gain trustable content.
6 References
Knowledge-Based Product Development and the Project Compass
New perspectives for technical communicators and a tool to guide them

1 A vision of technical communication

Generally, we see technical communication as the process (or cluster of activities) leading to a communication product. To quote tekom Europe (n.y.):

Technical communication is the process of defining, creating and delivering information products for the safe, effective and efficient use of technical products (technical systems, software, services).

The above definition, for all its orientation towards an up-to-date definition of “product”, clearly implies that technical communication follows the product. Also, the technical communication process appears to be subsequent to the process of defining, creating and delivering the product itself (see Fig. 1).

This definition has its righteous place with certain products, such as heavy machinery, where the (relatively few) users have to be kept up to date as to new developments in their professional domain. However, the case is very different for products from the software and service industries. Gray (2012:25) speaks of these as the “product as a service avatar”. The original product here is no longer a completely different entity from the communication product (Zehrer 2014:132). Methods such as Lean Start-up (Ries 2011) and the Design Sprint (Knapp/Zeratsky/Braden 2016) radically pull the entanglements between product, design and communication – all in their
broadest sense – into the light. There still is product functionality that needs to be implemented technically. However, some parts of it may turn out to be less useful than they appeared at the onset of product development, while others will need to be reworked to become more intuitive.

All this has an effect on the role of the technical communicator. In fact, several authors point out that the technical communicator is often the first user of a product. As a side-effect of his or her need to understand a new product well, (s)he often produces valuable feedback about the product (Alexander 2007; Grupp 2008). Technical writing turns out to be an instance of “knowledge work”, a dynamic process that incorporates both learning and creativity through “production”. (Reddy 2016:17; quotation marks in the original)

During the process, technical communicators do not function as mere receivers of information. Naturally, they need to receive information in order to do their job. But they also have to understand a product well enough so that they can judge the relevance of a piece of information and then decide whether they put it in the documentation or not. Only after these product-oriented activities does the well-known step of presenting information in an easily digestible way ensue. In sum, technical communicators have to make informed choices not only about the packaging (form), but also about the content. The circle closes here, as the technical communicator’s role reveals itself as that of an early advisor in product development. Also, technical communication itself should not lag behind product development, but inform it (see Fig. 2).

The questions arising from this new view on the communication process and product are: How and where does this new type of technical communication take place? And how can technical communicators conquer their new professional challenge effectively?

The following sections answer these questions by diving deep into the reality and theory of present-day technical projects. This is
followed by the introduction of the project compass – a tool that supports practice while also guiding research.

1.1 The reality of IT projects

As the saying goes:

In theory there is no difference between theory and practice. In practice, there is.

This is particularly true of project management, where the management was – and still is in some instances – strictly separated from work on the product. In general, management was based on the view of a project breakdown chart, a pyramidal structure where each entity is linked to the one hierarchically above it by an n:1-relation. In that same line, projects were run on plans looking one, two, or more years ahead. This method is known as the “waterfall”.

![Project Breakdown Chart](image)

The divide between project management and project work is also reflected in definitions of project communication, which foreground communication about project work, but not within the scope of project work. Freitag (2011:35) points to the divide between communication and media science, which have gained some insights into (project) communication, and economics and engineering, which deal with project management methods.

The “waterfall” comes from – and has its benefits for – large products assembled from small parts. In fact, project management was trialled and tested in large construction and engineering projects (Haughey 2014). With the advent of a large service industry and then of consumer software (think mobile apps), complexity arrived in the sense that multiple interdependencies – technical and non-technical – have to be dealt with (Gray 2012:82). In practice, this results in the difficulty of fixing requirements at the beginning of a project. Rather, requirements evolve as project work goes on (Opelt/Gloger2014:36).
Meanwhile, workers and customers must communally learn and co-adapt to an ever-changing knowledge base (Gray 2012:124). Classic project communication that functions in terms of the above-mentioned pyramid is of little help here.

### 1.2 Project communication

From a communicative point of view, the problems of the *waterfall* are reinforced when we take a closer look at its communicative counterpart: requirement specifications. These are the documents where all features of a project and their respective characteristics/qualities are listed, and which form the basis of classic project management approaches. In fact, requirement specifications are acts of specialized communication in form and word choice.

As a result, they can be a huge obstacle to communication between project managers, customers and the people who really do the project work, like software developers or designers. This challenge is even greater for the technical communicator, who has to understand all sides to make a product effective, efficient, and safe. A new view of project communication is needed, which surmounts the neat divide between “content” and “communication” found by Freitag (2011:35). We define “project communication” here as

all communication happening during a project and all communicative outcomes resulting from a project.

Before we go deeper into how a technical communicator can overcome the inherent challenges of project work, they will be conceptualized from a semiotic point of view as “decontextualization”. It will then be demonstrated how so-called “Agile frameworks” have contributed to solving some of the problems linked to decontextualization.

### 2 Framing the problem: decontextualization

In the preceding sections, we have seen that IT projects, as instances of *knowledge work*, are highly complex. It is in the nature of complexity that it cannot be handled by classic project management and project communication, which mean long-term planning, fixed requirements, and a lot of specialized language. In fact, if an organization wants to succeed in an ever-changing environment, it has to be adaptive and able to take cues from its environment. For a company to be a “learning organization”, both can really be considered as two sides of the same coin (Gray 2012:85).
This is also true for business units and projects (also known as pods; Gray 2012:137-138). Here, so-called Agile project management frameworks provide part of the answer. As I have written elsewhere (Zehrer 2012:248), Agile project management differs from the waterfall in that it bases more of the communicative burden on artefacts, and in that it frames requirements in less abstract terms. We will see more concrete examples of this in sections 2.1 and 2.2 below.

Christensen (2012:104-107) speaks of “intrinsic coordination”, which he defines as

the integration of interdependent work task (sic!) by virtue of individuals acting on the physical traces of work previously accomplished by others.

Going back to Ryle’s (1955) idea of “heed concept”, Christensen demonstrates the indivisibility of working on a task and communicating its state with examples from construction projects. The same was also found for interactive socio-technical systems, like software, by Koch (2008:47).

From more of a bird’s-eye view, these findings can be explained based on Clark’s (1996:65) concepts of “common ground” and “coordination devices” (Zehrer 2014:106-110): while common ground is established constantly during an interaction by foregrounding certain physical objects or previous enunciations, coordination devices are all signs and objects foregrounded in order to jointly accomplish any human task.

This underlines the importance of real artefacts for project communication. For the technical communicator’s role in knowledge work, we can state that on the one hand, communicative acts are produced against the backdrop of products under development; inversely, these acts can form the material new product developments are made of.

After this excursus into the theory and impact of organizational semiosis, let us now take a more concrete look at Agile frameworks: How do they achieve recontextualization? And what are the gaps between project work and communication that remain to be bridged, possibly by technical communicators?

2.1 Conquering the challenge: Agile frameworks

In the previous sections, we have learned about the decontextualization problem, and how context can be reintroduced. Agile frameworks are practical examples here, bridging the often-experienced gap between what is done in a project and how the stakeholders speak about it. They do this by building a system of shared rules and pro-
cedures, propped up by visibility (Reddy 2016:32). The best-known Agile frameworks today are Scrum and Kanban. The key principles from the so-called Agile manifesto include the following:

- Individuals and interactions over processes and tools
- Working software over comprehensive documentation
- Customer collaboration over contract negotiation
- Responding to change over following a plan (Beck/Beedle/van Bennekum et.al. 2001)

In the general discussion, these principles are seen as a way of making early and frequent adaptations of a product under development possible (Gloger 2016:53; Reddy 2016:43).

Much of the effect here stems from making projects visible and tangible in the narrow sense of the word: What used to be rather technical requirement specifications are now expressed as common-language user stories (see section 2.2. below). The content of these user stories is regularly compared with the real product being built. And what parts of the work are being done by whom is discussed in short intervals and made visible using physical or electronic boards (see section 2.3 below). In addition, quality standards, known as “Definitions of done” are also communally agreed upon and published (Anderson/Carmichael 2016:22-23).

As we have already seen, shared environments make it possible for communication to just happen by virtue of it being a heed concept to the production process. In other words: project workers need not make additional efforts in order to tell what they are working on. However, we must keep in mind that Christensen studied construction projects. These clearly differ from service and IT projects in that their artefacts are more clear-cut. He also points out that individual expertise (in the building domain) is needed to correctly interpret the “taskscape” thus produced (Christensen 2012:106).

When products are less tangible, and expertise distributed among a knowledge work team, the taskscape needs to be complemented by verbal communication and explicit rules. In the next two sections, we will look at two practices that help Agile projects bridge the communicative gap: user stories and issue management software.

### 2.2 Bridging communicative gaps: User stories

User stories are a central method of most Agile frameworks. They are the quasi-substitutes of the requirement specifications from earlier project management methods. Their function for project work is to describe a small unit of product capability from the target user’s perspective in common language.
User stories are either written on cardboard boxes (see. Fig. 4) or kept track of in an issue tracking system (see section 2.3). However, two (and a half) more aspects belong in a proper user story: talk about the aim and content of a user story among all parties involved; a piece of running software to compare to the original written form; and tests as criteria to determine whether the gist of a user story has been successfully implemented (written on the back of the above-mentioned cardboard box). This “card, conversation, confirmation” triad was first introduced by Jeffries (2001; see also Cohn 2004:4;26). For completeness, tests shall also be described as simply as possible.

User stories give (future) users, developers and project managers an incentive and a method to communicate about software requirements, and to compare what users want to what was really developed. This way, stories bridge the gap between the different perspectives cross-functional teams and their stakeholders have on their work. The method also caters to the need of technical communicators to understand the product and facilitate the development process at the same time as well.

We have seen that user stories help (re-)contextualize project work by introducing non-technical language as well as linking requirements to tangible outcomes. Other approaches from Agile practice include visible boards, published rules, and ritualized regular meetings. In the following section 2.3, we will get a short overview of how these are put to work with the help of issue management systems. We will also see some of their shortcomings, which might be cured by a technical communicator using the project compass (section 3).
2.3 Dealing with the practicalities: Issue management software and stand-up meetings

In the preceding section, we have seen that user stories answer the decontextualization challenge through common language and by evoking everyday contexts. It has already been mentioned that Agile frameworks partly rely on the visualization (and tangibility) of artefacts and their respective states. For large projects, or projects where workers are not collocated at the same geographic site, issue management systems are used to provide such functionality. Fig. 5 shows a very lightweight example of a “board”, the typical team view in the issue management system. Note that the different stages of the work progress are also visualized, as column names.

In most Agile projects, board entries are called „tickets“. Tickets normally move through the board from left to right, whereby the progress is tracked based on the agreed-upon work process. A precondition for a ticket to travel from one column to the next is usually that the team’s definition of done for the previous stage has been met.

Most software projects have more than four steps to completion, like so-called “refinement” stages where backlog items are talked over with the customer and framed more precisely, or testing stages. In addition, some stages are tied to (semi-) automatic processes, like asking a fellow worker for a code review on an online repository, compiling code, or running automated tests. So, going through the whole procedure adds a new type of complexity and decontextualization.

The usual way to “pull it all together” is a small team discussion at the “daily stand-up” (a meeting done standing so participants keep it short). Also, plans on how to go about the respective working day are briefly discussed during the stand-up. In practice, these meetings...
tend to be very efficient. However, they still present a huge challenge for everyone on the team. First, because the originally transparent procedure is obfuscated by complex technical dependencies and procedures running in the background. Second, because some user stories do not have classical end users in mind, but e.g. other developers, media providers, or hardware companies. In all cases, the “use value” delivered is hard to grasp without a sound understanding of the subject matter. In the following section, the project compass is presented as a tool for technical communicators and other team members to better handle this type of complexity.

3 The project compass

In the previous sections, we have seen how Agile methods help conquer the challenge of project complexity through recontextualization. We have also discovered that the tools needed to visualize and partly automate work on large and geographically distributed projects may not solve all of the inherent problems of present-day product development. In fact, they add a new layer of decontextualization. From a semiotic and communicative point of view, the remaining complexity of tech projects lies in the multi-dimensionality of all utterance, which is also partly hidden. So, when a ticket is discussed during the daily stand-up, several aspects need to be considered, but not all of them are explicitly addressed.

To help technical communicators facilitate the establishment of a reasonable context, we can go back to technical communication’s terminological and structuralist roots. These postulate that there are different aspects to a sign. The project compass transfers this to the project situation. Using a variant of Schubert’s (2007) “integrative model of technical communication”, it posits four dimensions: requirements, process, documentation, and people. (For yet another categorization, see Zehrer 2014). In its practical application, the compass can be hung up in the meeting room and remind team members to address all four perspectives in a statement. Questions by which this can be done are given as an example in Fig. 6.
The method works by systematically pointing team members to fill in information on all four dimensions, thus making assumptions explicit, broadening on common ground and contextualizing utterances. So, e.g. when a team member reports on a feature she tried to implement (requirements dimension), she will also have to say how far she got, or whether she finished the step as defined by the team’s rules (process), and where the result and any comments can be found (documentation). By reporting, she also refers to herself as a person who did the work (team).

Inversely, when team members plan their work for the respective working day, they name the task (requirement) and assign accountability (team). They must also estimate how much of the work they will get done until the next meeting (process) and explain what other artefacts their next steps will be based on (documentation). In its written-out form, this may look complicated, but it works quite well when integrated into a regular routine of *daily stand-ups*. The project compass leverages the advantages of Agile, contextualizing practices, but is itself neutral as to the project management method or framework it is used with.

Its importance from the perspective of technical communication lies in the way it constructs the outcome: as process and (integral part of a) product rather than as an additive to an existing product. And from there, it helps technical communicators to fruitfully participate in the process and be part of the co-creation of a complex knowledge product, which remains effective, efficient, and user-friendly.

We started this section with the conclusion that IT projects had again become decontextualized by the use of software systems and
the sometimes hard-to-grasp value they have to deliver. As an answer to this challenge, the project compass was introduced. Going back to the structuralist roots of technical communication, it helps technical communicators co-construct communicative processes and outcomes for today’s knowledge-intensive products.

4 Outlook and research implications

At the beginning of this article, it was stated that technical communication, if it wants to stay relevant, should not limit itself to describing a “real” (i.e. non-communicative) product after that same product has been fully developed. This was underlined by framing products as service avatars resulting from knowledge work.

The challenges posed by knowledge work may be overcome by recontextualizing the complex learning and decision-making taking place, a reasoning already followed – if only implicitly – by the practitioners who introduced the so-called Agile practices.

This paper introduces the project compass as a semiotics-based method to facilitate communication in knowledge-intensive work processes. This has implications for the role of the technical communicator, the scope of its responsibilities, and the research needed to equip this role with tools, skills, and arguments.

For technical communicators, the project compass is a tool to help them facilitate project communication and gain insights from it for their own tasks at the same time. The technical communicator knows better what questions to ask, and how to evoke the right sort of communication from other members of a cross-functional team. This is especially true for so-called “lean” product development, where product features are reduced to a minimum, and function, design and self-explanation need to complement each other in a very fine-tuned way.

With this, we arrive at a stage where (specialized) communication becomes an integral part of the product. To give a name to the indivisible unit product and communication have become, we might speak of “knowledge-based product development“ (see Fig. 5).
The advent of knowledge-based product development means, in turn, that the technical communicator is now really in a position to actively influence product development. On an operational level, this happens e.g. by making suggestions as to a product’s features and usability, by making it more self-explanatory or adding the add-on signs (linguistic or non-linguistic) to explain it. On a tactical or even strategic level, technical communicators are now in a position to influence and manage the entire product development cycle.

As for the research implications, real interaction data from projects should be used to double-check whether the four dimensions of “requirements”, “process”, “documentation” and “team” are really of any help, or in what way they should be replaced by others. More generally, data discovery methods should be applied to annotate real data and gain more systematic insights into how technical and professional communication work in knowledge-intensive processes.

5 References


Mediating between Cultures in Multisemiotic Persuasive Texts: Key Competences for Website Localizers and Technical Communicators

Abstract

Various definitions have been given to website localization depending on the perspective of people who approach it (Folaron 2006:197). Translation Studies scholars approach website localization as a translation modality that can be included in a broadened concept of translation (Gouadec 2007, Nauert 2007, Gottlieb 2005, Pym 2004). From this viewpoint the competences of the website localizer bear many similarities to those of the translator (Jimenez-Crespo 2012). On the other hand, the competences of the website localizer also bear many similarities to the ones required by technical communicators, such as target analysis, source analysis, development of an overall strategy and Project Management (Risku 2004).

According to Minacori and Veisblat (2010: 753) one of the basic elements that differentiate technical communication from translation is the fact that in the former the produced text is created from scratch. On the contrary, translation includes the creation of a target text on the basis of a source text. Website localization can be viewed as a form of translation in the sense that there is always a pre-existing website, usually an internationalized one, that constitutes the starting point of the process. However, localization very often entails changes that reach the level of recreation, rewriting and redesign with the aim to achieve cultural customization and a maximum degree of persuasiveness. Thus, we could assume that website localization constitutes a meeting point for translation and multilingual technical communication.

Based on Minacori and Veisblat’s (2010: 765) comparison of translators’ competences and technical communicators’ skills, we will focus on two of these competences, namely intercultural competence/skills and visual literacy. Findings of previous research on multilingual corporate and NGO websites will allow us to highlight
the crucial role of cultural knowledge in website localization as well as the need for visual and multimodal literacy development both for website localizers as well as technical communicators regarding the corporate and NGO website subgenres.

1 Introduction

Translation and technical communication are very often distinguished on the basis of the existence or non-existence of a source text (Minacori and Veisblat, 2010). However, there are nowadays many types of translation in which the existence of a source text is not taken for granted. Fontanet (2007: 90), has posited that “[…] we constantly come in contact with texts whose origin we are unaware of” […]. Lambert (in a series of articles and essays published during the 80s and the 90s in Hermans 1999: 121-122) emphasizes the need to reconsider the pre-existing translational concepts and methodology. He associates translation studies with international discourse and mass communication and refers to the cultural impact of new forms of communication involved in translation and to the fact that translation products very often put on the mask of an “original” especially in genres such as advertisements, intermediate text production and incomplete forms of texts to be translated. Also, the author posits that translation studies can abandon older concepts such as the ones referring to source text and target text. Similarly, Pym (2012:1) questions the concepts of source text and target text claiming that there is “no longer a binary organization around ‘source’ and ‘target’. We now have Start Text (ST) complemented by source materials that take shape of authorized translation memories, glossaries, terminology bases and Machine Translation feeds”.

Website localization constitutes a type of translation in which the notion of language pair itself has been questioned since in most cases it is very difficult to find a specific source text. In website localization the source text could be the internationalized website, another linguistic version that might have preceded the internationalization stage or even material, complete or incomplete, collected by pre-existing versions in the same or in (an)other language(s) (Charalambidou, 2012). In this sense, the tasks of the website localizer are very close to those of the technical communicator whose work “entails designing and writing a document from scratch, in one language” (Minacori and Veisblat, 2010).

Additionally, the concept of translation has been transformed in years, exhibiting elements of convergence with technical commu-
nunication. It is worth noting that in western civilizations translation has been traditionally conceived as a process of transfer, repetition, similarity, substitution and equivalence. However, this view of translation is considered, according to Grammenidis (2015: 16), as a sterile and problematic one since it focuses on the lexical unit and considers the word as the main unit of translation. As the author states (ibid: 17), viewing translation as transposition or as a second order writing leads to an obsolete and stereotypical view which imposes limits on the process itself and underestimates the translator’s role to that of a simple operator. On the contrary, in non-western civilizations there is no concern about the degree of similarity between the source text and the target text. Diversity is considered inherent in translation and is, in fact, expected (ibid: 16). Gouadec (2009:45) suggests that we should abandon the term translation and declares the beginning of a post-translation era. This position is in line with the emergence of new forms of multilingual communication due to technological advancement. The traditional view of translation as a transfer cannot include processes such as localization, dubbing and multilingual documentation and, thus, a novel concept of translation is required.

In the light of functional theories, concepts such as functionality, loyalty and purpose of the translation (Reiss and Vermeer 1984; Nord 1991: 28 and 1997: 123-128) have broadened the traditional concept of the field, allowing for the inclusion of various translational types, some of which often reach the level of rewriting and recreation.

According to Gottlieb’s (2005:35) multidimensional definition of translation, it (translation) can be:

…any process, or product hereof, in which a combination of sensory signs carrying communicative intention is replaced by another combination reflecting, or inspired by, the original entity.

The terms “reflect” and “inspired by” are indicative of a change in the relation between source text and target text as well as of a broader view of translation which can consist of rewriting and recreation processes.

Also, Gerzymisch-Argobast (2005:3) focuses on the fact that the product of translation can include any type of material (knowledge (system) or text in its widest sense) “irrespective of whether the translated product is in the same (national) language or not, written, spoken, or signed, in linear or non-linear form, technology-driven and multimedia supported or not”.
Website localizers work on texts which are multisemiotic including both verbal and non-verbal elements. They need to translate or very often redesign the visual elements such as graphs, images and sounds that the multimedia product comprises. Thus, the process of website localization can very well fit into the concept of multidimensional translation and can be studied as one of its sub-types (Nauert, 2007:5).

The fact that website localization is included within the field of Translation Studies constituting at the same time a realization of new theoretical concepts and new practices in the field exhibiting, in this way, partial overlapping with the field of technical communication, has intrigued us to study two of the website localizers’ competences which seem to overlap with competences that have been suggested for technical communication professionals. According to Gouadec (2002), the multiplicity of functions that the translator has to carry out as well as the high level of specialization (depending on the field, the tool and the document’s type) outline a set of different types of knowledge and special competences that the multilingual and multimedia communication expert needs to possess. In the following sections we will attempt to outline the competences that overlap between the two profiles and suggest the need for an additional one.

2 The website localizer in between translation and technical communication

Translation and technical communication constitute two separate scientific fields which at the same time seem to converge at several points. According to Suojanen and Koskinen (2015: 148), “at contemporary workplaces, translators and technical communicators often work on the same projects, and they face similar types of challenges during the text production process”. The writers (ibid: 148) claim that one of the main parameters that seem to affect the work of both translators and technical communicators is that of usability, which they consider as a sine qua non competence for both professions. In fact, they suggest (ibid: 149) the collaboration of the two professions with “usability as a focal point” stating that the need for the merging of translator and technical communicator roles has been previously predicted by other scholars (Grecchi, Maylath, Mousten, Scarpa, and Vandepitte, 2011 cited in Suojanen and Koskinen, 2015). Similarly, in website localization usability is of utmost importance as it very often includes website design. Although web localizers are not usually trained on the basis of usability methods as they are presented
by Suojanen and Koskinen (2015) their training should be user-ori-
tented through the application of functional translation theories (San-
drini 2005, Charalampidou 2012), such as Skopos theory (Vermeer
and Reiss 1984) which focus on the communicative purpose and the
target audience.

The need for professional cooperation between the two fields
has also been suggested by Minacori and Veisblat (2010: 763). The
authors (ibid: 752) have found that the professions of translator
and technical communicator have recently exhibited some kind of
convergence and based on the EMT’s list of translators’ competen-
cies (2009) they provide a detailed comparison of each profession’s
competencies/skills which, as they claim, could constitute “a frame
of reference in several fields, such as for establishing technical com-
munication curricula”. Minacori and Veisblat (ibid: 759) consider that
the growing concern over localization of software in the mid ‘80s
was a major factor that gave impetus both to translation and technical
communication. Additionally, studies on the macrostructure (content
categories) of localized websites have revealed differences that re-
late to cultural parameters (Singh and Pereira, 2005; Charalampidou,
2011) and highlight the need for complete redesign of websites ac-
cording to the user’s cultural context. Thus, the profession of website
localizer could constitute a space where the professions of translator
and technical communicator converge.

Additionally, Risku (2004: 181) reports that many technical
translators have migrated to the field of technical communication
and outlines some competencies of convergence and divergence in
the two professions. One of the competences found in both profes-
sions is the development of an overall strategy for their task as well
as the acquaintance of project management skills. However, regard-
ing the competence of target analysis, despite her assumptions that
translators are acquainted with preparatory processes such as target
group and target situation analysis, she found that “translators had
the source text as a starting point and began translating immediate-
ly” (ibid: 187) contrary to technical communicators’ preparatory re-
search. Also, with reference to source analysis she mentions that in
technical communication, “unlike translation, there is no well-defined
source text”.

Regarding the two latter competencies, the discrepancies are re-
duced in the case of website localization in the sense that in order
to achieve cultural customization the website localizer cannot com-
mence his/her task without taking into consideration the target au-
dience, the contextual situation and the translation’s communicative
purpose (Charalampidou, 2012). Also, as mentioned before, in web-
site localization the concept of language pair is questioned and the process is very often completed without a specific “source text” in the traditional sense.

Rude (2009: 175), also points out shared methods, theories and content areas between technical communication and, among others, design communication, rhetoric and composition, which are concerned with issues of usability and website design. The field of website localization is also directly related a) to design communication, since web localizers very often redesign the website, b) to rhetoric, especially when working on operative internet interfaces and c) to composition, since their work often entails rewriting.

The aforementioned studies are indicative of the fact that website localization is a space where the borderline between translation and technical communication is blurred. In fact, in the context of website localizers’ training both professions can be approached through the development of competences which are common in both profiles.

3 Localization competence and technical communication competence

Attempts to define localization competence reveal the way localization itself has been defined through time. The first one to mention the concept of localization competence was Wright (2004), who conducted a survey on members of the LISA association about the skills the future localizer should possess. He came up with a model which emphasized the knowledge of tools and electronic processes as well as translation competence and cross-cultural knowledge. Most of the models which were proposed later on focused both on software and web localization (Austermühl, 2006; Folaron, 2006; Pym, 2006; Archibald, 2004; DiFranco, 2003; Quirion, 2003) with the exception of the model proposed by Jiménez-Crespo and Tercedor (2012) which focused exclusively on web localization. The specific model was constructed on the basis of the PACTE translation competence model (PACTE 2005: 610, 2011: 331). For the needs of our study we adopt the web localization-focused model proposed by Jiménez-Crespo and Tercedor (2012) as a point of reference for the comparison to technical communication competence models. Its main component is the strategic sub-competence which interrelates with other sub-competences such as the bilingual, the extralinguistic, the instrumental, the knowledge-about translation and the psycho-physiological sub-competence (Jiménez-Crespo, 2012: 175).
In the present research we have limited our focus of analysis on the *special bilingual and extra-linguistic sub-competences* which, according to Jiménez-Crespo (2012: 178), “are shared to some extent with advanced bilinguals or general translators” but at the same time include specialized components that need to be specifically developed for web localization as this modality includes a wide range of different genres, text types and specializations, such as legal, technical, literary, journalistic, advertising and audiovisual translations.

(Jiménez-Crespo 2012: 178)

The detailed description of these two sub-competences includes various components. However, we will borrow only the components of a) *advanced technical writing skills in the target language*, b) *in-depth knowledge of cultures involved* (both are components of the bilingual knowledge) and c) *knowledge of hypertext theory, hypertextual structures, linking, etc.* (component of the extralinguistic knowledge).

The technical communication competence model that we adopt is the one developed by Minacori and Veisblat (2010: 765-768), which is based on the EMT competence model (2009) and seems to be the most detailed. In their model Minacori and Veisblat (2010: 765-768) add some skills to the profile of technical communicators, which are non-present in the EMT list of competences for translators. Out of the skills which are added, those which are relevant to our study belong to the categories of *writing skills*, *information architecture* and *visual literacy*. Although *language competence* is defined in the EMT list, it doesn’t include the *mastering concepts and methodology for web site content creation* which has been included in the *writing skills* section for technical communicators (ibid: 766). Also, the other two categories, *information architecture* and *visual literacy*, are present only in the list of technical communicators’ skills.

A summary of the competences/skills discussed are shown in the following table:
Comparing the three skills which are absent from the EMT list (2009) to Jiménez-Crespo’s (2012:178) model of localization competence we find a convergence between the localization extralinguistic sub-competence of knowledge of hypertexts and the mastering concepts and methodology for website content creation in technical communicators’ writing skills (Minacori and Veisblat’s, 2010: 765-768).

Also, the intercultural sub-competence seems to coexist in all three models. The EMT model and the Minacori and Veisblat model define intercultural competence/skills through identical components both for translators and technical communicators, and in Jiménez-Crespo’s (2012: 178) model the same competence is referred to as part of bilingual sub-competence.

Although we agree with Jiménez-Crespo’s (2012:178) model, which includes the knowledge of cultures involved along with advanced writing skills in the bilingual sub-competence we consider that the knowledge of hypertext theory should also be included in the bilingual sub-competence in the sense that it constitutes a new form of writing and reading. Also, in line with Minacori and Veisblat’s (2010: 765-768) model, which includes two new skills for technical communicators,
namely *information architecture*\(^1\) and *visual literacy*,\(^2\) we hold the position that they should also be included in the bilingual sub-competence for localization, however, in a new form. We consider that a separate competence called *multimodal competence* for web localizers/technical communicators should be added which can refer to the production and perception of multisemiotic units of meaning in a website.

Both technical communicators and web localizers work on hypertexts and need to develop competencies that will enhance their writing and reading skills in this genre, which is highly multisemiotic.

According to Yli-Jokipii (2001: 111), websites constitute a separate genre, that of hypertexts. Some of its differentiating features in relation to printed texts are the use of hyperlinks for the formation of their hierarchical structure, which is mostly non-linear, as well as the low level of cohesion usually attained on the macrolevel, mainly through non-linguistic means, such as the clicking of a link. In fact, the visual semiotic system very often contributes to the creation of textual cohesion in hypertexts. Additionally, Storrer (1999: 40) states that coherence is not inherent in hypertexts, but it can be created during the process. Thus, communicative context contributes to meaning connection.

Low-level cohesion in hypertexts is a result of the fact that each web hyperlink leads to a separate and independent text, which can be the object of reading without necessarily precedent reading of the website’s other textual units. This contributes to extensive use of content repetition which may be available multiple times through various sources (links).

Additionally, hypertexts allow multiple reading paths since the reader is not limited to a unique linear path predefined by the author. On the contrary, the reader can create his/her own reading paths by selecting different links and even skip parts of the website and pass on to other websites (Janoschka, 2004: 171-172; Yli-Jokipii, 2001: 106; Fritz, 1999: 222; Landow, 1997: 3).

The absence of linearity found in hypertexts creates new standards in the way of reading and writing and, thus, in the way of creating meaning. It is characteristic of the genre that there are theoretically many points of introduction to the text and these are

\(^1\) We refer to a specific component of *Information Architecture* which is described as “Knowing how to define the macrostructure of a document and its overall consistency (including where it consists of visual and sound elements)” (Minacori and Veisblat, 2010: 766).

\(^2\) We refer to the visual literacy’s components of a) “How to create or choose illustrations that accurately convey the message (pictures, screen captures, hand gestures, pictograms...),” b) “Knowing how to organize illustrations, how to display them for maximum meaning, to catch the reader’s attention” and c) “Knowing how to use pictograms and the related conventions (positioning in a document, appropriate number, colors, adapted to the local culture or culturally-neutral).”
not limited to one semiotic system. The reader may focus initially on a non-verbal sign depending on the way the webpage is structured. The multimodal nature of hypertexts, such as websites, leads to the integration of multiple semiotic sources and, as a result, the reader moves very quickly from verbal signs to visual ones. Kress and van Leeuwen (1998: 205) have posited that the process of scanning precedes the process of reading and that scanning is related to the degree of emphasis given on various semiotic signs found in a multimodal page. During scanning, the reader’s eyes focus on the center of visual impact, which according to Wee (1999: 21) constitutes the point of introduction to the reading path of a multisemiotic text and is its main theme. Bohle (1990: 36) points out that without the center of visual impact, the webpage remains for the reader a sum of complicated signs which compete with each other to attract his/her attention. Thus, the semiotic choices made by the website designer seem to play a decisive role in the reading process of multimodal texts and in the meaning that they manage to convey.

Professionals who work with hypertexts such as website localizers and technical communicators need to get acquainted with their textual characteristics so that they are in a position:

a) to analyze and comprehend the multisemiotic meanings conveyed and

b) to produce texts whose meaning arises through the synergy of various semiotic systems and in a non-linear way.

We should point out that multisemiotic meaning-making in the context of a website is very often related to cultural parameters which seem to define the verbal and non-verbal elements used. Cultural differences in design have been extensively studied in international marketing research (Al-Olayan and Karande, 2000; Albers-Miller and Gelb, 1996; Cutler and Javalgi, 1992; Tansey and Hyman, 1990). Also, research in international interface design has focused on differences in visual representation and website layout in different cultures (Dormann and Chisalita, 2002; Schmid-Isler, 2000). The culture-specific parameter of color has also been studied at length both in Human-Computer Interaction literature (Russo and Boor, 1993; del Galdo, 1990) and in empirical studies (Duncker, Theng and Mohd-Nasir, 2000; Barber and Badre, 1998). Additionally, several studies have attempted to relate website design/website localization to Hofstede’s cultural dimensions (Callahan and Herring, 2012; Charalampidou, 2011; Simin, Tavangar and Pinna, 2011; Singh and Baack, 2004; Dormann and Chisalita, 2002; Marcus and Gould, 2000; Robbins and Stylianou, 2000).
Thus, multimodal competence should be correlated with and taught alongside intercultural competence. Moreover, we consider that multimodal literacy competence should be developed in relation to specific genres and to specific functions. According to Jiménez-Crespo (2012: 97) there are various website subgenres with different main functions. Based on previous research that we have conducted on corporate and NGO websites (Charalampidou 2012, forthcoming) we will attempt to relate the multimodal literacy competence development in relation to these two genres.

According to Jiménez-Crespo’s (2012: 97) categorization of web genres for translation purposes, the corporate website’s function is both expositive (provides information) and exhortative (modifies user’s behavior) and the NGO website’s is mainly exhortative (modifies user’s behavior). However, according to Reiss (1971/2002), in cases where more than one function coexist, which is the most frequent case, only one of them prevails. In a study (Charalampidou, forthcoming) that we have conducted on NGO website localization in English, French and Greek, we came to the conclusion that their most prevalent function is the operative one.

Research on the microstructure of corporate (Charalampidou 2012) and NGO Greek localized websites (Charalampidou, forthcoming) has revealed a tendency towards cultural customization through adaptation of both verbal and pictorial persuasive means and on different levels. For example, in Greek corporate websites, extensive use of verbo-pictorial metaphors was observed even in cases when there was no metaphorical meaning in other linguistic versions of the same website. Also, in NGO websites major differences were found in the type of emotional appeal used according to the audience addressed. The tools that we used for such analysis were drawn mainly from the field of social semiotics such as Barthe’s (2007) theory of image and text relation, Kress and van Leeuwen’s grammar of visual design (1996) and grammar of colors (2002) and optical metaphor theory (Forceville, 2009). Multisemiotic meaning-making was correlated to cultural parameters using Hofstede’s (1991) cultural dimensions and Hall’s (1976) theory of high-context and low-context cultures. The interaction between image and text and their synergy in persuasive meaning-creation according to the audience’s cultural background are parameters that the professional web localizer and technical communicator should be aware of regarding the two website genres under discussion. Professionals and trainees would benefit a lot from getting acquainted with the previously mentioned theories and analytical tools, as they would be in a position to decipher culture-specific multisemiotic persuasive meaning.
4 Towards a multimodal literacy competence/skill in website localization and technical communication

Research on NGO and promotional website localization reveals the multisemiotic nature of the rhetoric used in these specific website genres as well as their interconnection with cultural parameters. Thus, we consider that next to the writing skills, information architecture and visual literacy which have been suggested as separate skills for technical communicators (Minacori and Veisblat 2010: 766) and next to advanced technical writing skills in the TL, in-depth knowledge of cultures involved and knowledge of hypertext theory, hypertextual structures, linking, etc. suggested for localizers (Jiménez-Crespo, 2012: 178), there could be one more competence/skill that describes the ability of the professional to produce operative multisemiotic content based on the receivers’ cultural background. The specific competence focuses on the microstructure of the website (the macrostructure is referred to in Minacori and Veisblat’s (2010: 765-768) model in the section Information Architecture), and it is genre-specific since it is relevant to NGO and promotional websites. Multimodal literacy refers to the practice of meaning-making involving the purposeful integration of semiotic resources including, but by no means restricted to, writing, images, speech, gestures, drawing and sound (Emmison & Smith, 2000; Kress, 2003; The New London Group, 1996; van Leeuwen & Jewitt, 2001). The proposed competence/skill’s components could be defined as:

▪ Knowing how to understand and analyze operative multisemiotic units of meaning
▪ Knowing how to produce operative multisemiotic units of meaning
▪ Knowing how to relate operative multisemiotic units of meaning to cultural parameters

The specific competence could also be integrated in the intercultural competence/skill as it is described in the EMT list of translators’ competences (2009) and the technical communicators’ skills (Minacori and Veisblat, 2010: 767).

The sub-competence suggested needs to be further subdivided and connected with specific activities through which the students (undergraduate or/and postgraduate) can be trained. The specific competence can also be enhanced through the instruction of theories and methodological tools drawn from the field of social semiotics.
5 Conclusions

Website localization and technical communication seem to share a lot of common space regarding the production of website content. The relationship between translation and technical communication has been an object of study in recent years, and there have been suggestions for collaboration between the two fields in the literature. Website localization is included in the new concept of multidimensional translation and, as a new form of multilingual communication, bears many more common elements with technical communication than more traditional types of translation.

Although there are various models that describe the competences/skills of translators, localizers and technical communicators, there seems to exist a discrepancy regarding the description of writing skills and of the type of literacy these professionals should acquire. We have suggested that multimodal literacy, which has been extensively discussed in the field of educational studies, be included in the list of competencies for website localizers and technical communicators.

The introduction of similar skills in translation studies has already been suggested by other scholars such as Sutiste and Torop (2007: 203) who have described a new tendency in the training of translators, that of the introduction of intersemiotic translation, for reasons that are both pedagogical (comprehension of the visual aspect of the text) and pragmatic (translating into a visual environment). Also, Remael (2001) has put forward the idea of teaching how to produce multimodal texts in Translation Studies but points to the fact that there have not been many examples of explicit training in multimodal text production for translation purposes. Additionally, Risku and Pircher (2008) propose translation training courses that would make future translators more aware of the importance of non-verbal elements. Similarly, the need for multimodal literacy in the field of website localization and technical communication is unquestionable and should start being explicitly taught in relevant curricula if we want to talk about real multilingual and multimedia communicators.

6 References


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Current Practices in Web API Documentation

Abstract

With the increasing use of APIs (Application Programming Interface) to provide web services, API documentation is becoming an important job opportunity for technical writers. API documentation has its own rules, starting from a specific type of documentation called “API reference”, which is typically written following a predefined template.

This research analyses how eight web API references are structured, and which other kinds of API documentation are added outside of the scope of the reference itself. The goal is to provide factual evidence for the role of technical writing techniques, in order to write web API documentation.

Results show that multiple aspects require attention by professional technical writers: variations in using the reference template, terminology issues, a typical task-oriented approach (indicated by interactive features and by a descriptive approach to writing headings), and the need for additional kinds of documentation (like overviews and Get Started guides).

1 Introduction

Web service APIs (Application Programming Interface) are code frameworks widely used to offer a huge variety of services and information on the web, making them a strategic asset of web companies (like Google, Facebook, and Amazon). In order to integrate web services into their web sites and applications, web developers need a specific type of documentation called “API reference”, which is written following a predefined template.

Writing API documentation by using a predefined template could be considered an easy task, which even an API developer himself could manage with the aid of dedicated software tools. This report discusses this idea, by describing how reference templates are actually applied and what kinds of additional documentation are used.

The report covers the analysis of eight samples, half of them from a list of the most popular APIs and half from a list of market
leader APIs in recent growing trends. All samples relate to a single API architectural style (the REST style, Representational State Transfer), which is the most recent style adopted for web services. The number of samples is limited, but this analysis could suggest at least some common issues with API documentation. It must be underlined that these samples do not necessarily represent best practices used in the field. Another limitation is related to the quantitative approach of this study. A basic reference template has been defined to try to quantitatively measure additional components added to the basic template, but categorising of additional information is largely subjective, since it has been performed by the author himself.

Results are based on the analysis of the available content, without taking into account constraints posed by the possible use of software tools to automatically compile API documentation from code. The report covers aspects relating to types and structure of content, while details of language style are generally not considered.

The report consists of five sections. Section 1 (this section) provides general information about the research purpose and limitations. Section 2 presents a definition of what API documentation is as a kind of reference, and a review of studies on the topic of API documentation, which has usually been considered as related to the issue of usability. Section 3 covers methodology details. Section 4 presents results and discusses possible implications for technical writing. Section 5 summarises the discussion of results into three aspects of API documentation that are of interest to professional technical writers, recommends the adoption of a task-oriented approach, and suggests further research.

2 Literature Review

Current research on APIs is mainly focused on coding best practices and usability from a programmer’s standpoint. APIs are a type of coding, and this fact makes understandable the primary focus on addressing programmers’ need for practical techniques to be applied in the field.

This issue is of major importance given the public nature of APIs, which are made available to a vast number of programmers on the web. In a recent article on the subject it is noted that, despite the large amount of available APIs and their increasing relevance in the software industry, they “are often difficult to use, and programmers at all levels, from novices to experts, repeatedly spend significant time learning new APIs” (Myers and Stylos 2016, p.62). In this context, the importance of documentation for effective use of APIs is clear.
A qualitative analysis of API learning obstacles, conducted by surveys of and interviews with 440 Microsoft developers, found that inadequate documentation is the most severe obstacle that learners of an API must face (Robillard and DeLine 2011).

The following two sections provide a definition of what API documentation is and discuss how the topic of API documentation has been primarily treated as an aspect of usability research.

2.1 A definition of API documentation

The concept of “API documentation” can be confusing. It is necessary to distinguish between what an API itself is and what is needed to use it. An API “consists of a set of rules describing how one application can interact with another, and the mechanisms that allow such interaction to happen” (Maddox 2014). Starting from this definition, rules could be considered as “facts”, from the point of view of technical documentation. This is the approach adopted by DITA (Darwin Information Typing Architecture), one of the most widely used XML-based frameworks for technical communication, where API documentation is considered a major example of the reference topic type; a reference “typically describe[s] facts about application programming interfaces (APIs), commands, utilities, tools, components, or other objects” (Bellamy 2012, p.80). These facts are derived from the API code itself, as components of a basic level of documentation.

A more detailed description of what API documentation as a reference should cover comes from a practitioner’s point of view: “syntax of each operation; a description of what the operation does; what parameters the operation takes, including default values, valid values, and type of data—Boolean, string, etc.; what data the operation returns; error messages you might encounter using the operation examples” (Marvin 2014, p.7). This kind of information can be automatically extracted from the API code by using software tools, like Javadoc (which was created for documenting Java language).

While this basic information can be sufficient for very simple APIs, modern complex APIs require additional information, to effectively help programmers in understanding and using API code: “delivering a Javadoc or Doxygen output for a library-based API won’t teach users how to actually use your API. You still have to describe scenarios for using a class or method, explain how to set your code up, what to do with the response, how to troubleshoot problems, and so on. In short, you still have to write actual help guides and tutorials” (Johnson n.d.).
The importance of API reference documentation has been confirmed, however, by a recent study (Meng et al. 2017) based on expert interviews with 14 developers, whose outcomes have been assessed by a follow-up questionnaire answered by 112 participants. This study found that API reference is the third information source for developers to get started (after code examples and tutorials), while it is the first information source when developers need to solve problems later.

2.2 The role of API documentation in API usability studies

The issue of API documentation has been mainly addressed in the context of usability research; the “effectiveness of documentation” was highlighted as a research challenge in one of the first usability studies conducted specifically on the topic of web APIs (Beaton et al. 2008, p.33).

Only one study has focused so far on the content itself of API documentation, by identifying 12 knowledge types in the Java SDK and .NET documentation (Maalej and Robillard 2013). This study shows that information about functionality (what the API does) and structure (description of elements organisation) is largely prevalent over other types of information (like concepts), and that a large amount of redundant information is given. Results from this study do not address, however, how the documentation is written from the standpoint of technical writing techniques.

More generic suggestions about API documentation are provided by usability studies. A study on the usability of web documentation of a large business-oriented API framework (the early version of enterprise Service-Oriented Architecture, or eSOA, offered by SAP) has been conducted with a small number of Master’s students (8) interested in engaging with this technology, with different levels of knowledge about Java programming and business processes (Jeong et al. 2009). The API documentation that was examined by the authors contained “a large amount of hand-created content” (Jeong et al. 2009, p.88) (as opposed to documentation automatically extracted from code using software tools like Javadoc). This study found that in API documentation difficulties can arise from unclear or unknown terminology, complexity of content hierarchies, and difficulty in browsing and searching information. The main recommendation by the authors of the study was to “provide flexible ways to navigate for different users with different backgrounds” (Jeong et al. 2009, p.87). This recommendation confirms that also in the field of API documentation there is a need for technical writing techniques to address
issues that are typical of software documentation. The need for more traditional documentation aids, like an overview, had been already found in a study regarding programmers’ needs in using an SDK (Software Developer Kit) by Nyzaka et al. (2002). These two studies pose the question of how traditional approaches to documentation (like information structuring and searching) could be applied to API documentation, where pure code information tends to be prevalent.

API documentation can be automatically extracted from code comments by using software tools. Some research has mainly focused on how to improve such documentation, for example highlighting usage directives (Dekel and Herbsleb 2009), using usage information to improve searching (Stylos et al. 2009), or selecting relevant information by using word patterns (Robillard and Chhetri 2015). One study has specifically directed its attention to web sources of information that are used by programmers (Parnin and Treude 2011). This study found that blog posts are the second most important information source about APIs, after the official API documentation. Moreover, results from this study showed that the official support documentation (like tutorials) offered to developers was far less used than other web sources (like blog posts, forums, and unofficial documentation).

It can be concluded that research on the topic of API documentation has been mainly conducted as part of usability studies, without addressing the issue of how the documentation content itself is structured. This research aims to explore samples of web API documentation to analyse how technical writing techniques are actually applied, to provide useful directions to technical writers.

3 Methodology

The hypothesis underlying this research is that technical writing techniques have a major role to play in making API documentation usable to developers.

Data has been gathered through a content analysis of eight samples of API reference, freely available on the web and relating to REST architectural style, which, according to a recent report, currently accounts for 83% of available public APIs (Geene et al. 2017). Four samples are the most popular APIs according to ProgrammableWeb (API Directory n.d.) (see Table 1), and four samples are category market leaders according to growing trends assessed by Geene et al. (2017) (see Table 2).
The main part of the study is aimed at researching the use of the reference template. Each API reference is compared with a basic template, as defined according to common usage by practitioners (Marvin 2014, p.7), which includes the following components:
1. Syntax
2. Description
3. Parameters
4. Return data
5. Status/error messages
6. Request example
7. Response example

Note that component number 5 is defined by Marvin (2014, p.7) as “error messages you might encounter using the operation examples” (emphasis added), while in this study it has been named “status/error messages”, to encompass two different kinds of diagnostic information which are usually listed together by samples (status codes and error messages).

Components of the basic reference template have been identified by searching for related textual labels, when available. Subsequent analysis has been conducted to classify variations in the use of the template, use of different templates for special cases, and the presence of additional information added to the main template.
In addition to the reference template analysis, navigational aids and additional documentation sections have been empirically counted and evaluated to provide a wider data framework for the final discussion of results.

## 4 Results and Discussion

Results are given in the following order: the use of the reference template, how the navigation among reference pages is organised, and which other documentation sections are added to the reference itself.

### 4.1 Reference template

Table 3 and Table 4 (data is split into two tables for convenience) identify the presence of template components and show how they are labelled (labels are quoted in sentence style). The analysis refers to the main template only, namely the template that is mostly used by each sample (excluding “irregular” custom templates, which are examined later in Table 5).

<table>
<thead>
<tr>
<th>Google Maps</th>
<th>Twitter</th>
<th>YouTube</th>
<th>Flickr</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Syntax</strong></td>
<td>(no label)</td>
<td>“Resource URL”</td>
<td>“HTTP request”</td>
</tr>
<tr>
<td><strong>Description</strong></td>
<td>(no label)</td>
<td>(no label)</td>
<td>(no label)</td>
</tr>
<tr>
<td><strong>Parameters</strong></td>
<td>“Request parameters”</td>
<td>“Parameters”</td>
<td>“Parameters”</td>
</tr>
<tr>
<td><strong>Return data</strong></td>
<td>(no label)</td>
<td>(N/A)(^3)</td>
<td>“Properties”</td>
</tr>
<tr>
<td><strong>Status/error messages</strong></td>
<td>“Status codes”</td>
<td>(N/A)(^5)</td>
<td>“Errors”(^6)</td>
</tr>
<tr>
<td><strong>Request example</strong></td>
<td>“Example [endpoint name] requests” (e.g. “Example Directions requests”) (1x) OR (no label) (3x)</td>
<td>“Example request” (default) OR “Example request using Twurl” (11x)</td>
<td>“Usage”</td>
</tr>
<tr>
<td><strong>Response example</strong></td>
<td>“Sample responses” (1x) OR (no label) (3x)</td>
<td>“Example response” (default) OR “Response” (2x) OR “Example response - Success” (1x)</td>
<td>“Response”</td>
</tr>
</tbody>
</table>

---

1. No syntax is given apart from the heading of the reference page (see Table 8).
2. The information is highlighted by a coloured background, however.
3. Return data is not listed apart from the response example.
4. Return data is not listed apart from the response example.
5. There is only a single general list of errors (labelled “Response codes”).
6. An additional general list of errors is also available.
7. No request example is given.
<table>
<thead>
<tr>
<th>Syntax</th>
<th>Dropbox</th>
<th>Infusionsoft</th>
<th>HubSpot</th>
<th>WooCommerce</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Syntax”</td>
<td>“URL structure”</td>
<td>(no label)</td>
<td>(no label)</td>
<td>“HTTP request”</td>
</tr>
<tr>
<td>Description</td>
<td>“Description”</td>
<td>(no label)</td>
<td>(no label)</td>
<td>(no label)</td>
</tr>
<tr>
<td>Parameters</td>
<td>“Parameters”</td>
<td>“Parameters”</td>
<td>“Required parameters”</td>
<td>“Available parameters”</td>
</tr>
<tr>
<td></td>
<td>“Body sample”</td>
<td>“Optional parameters”</td>
<td>“Identity parameters”</td>
<td></td>
</tr>
<tr>
<td></td>
<td>“Body schema”</td>
<td>“Optional query string filters &amp; options”</td>
<td>“Optional query string parameter”</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>“Allowed JSON fields in the body”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Return data</td>
<td>“Returns”</td>
<td>“Response schema”</td>
<td>“JSON fields returned in the response”</td>
<td>(N/A)</td>
</tr>
<tr>
<td>Status/error messages</td>
<td>“Errors”</td>
<td>“Response messages”</td>
<td>(no label)</td>
<td>(N/A)</td>
</tr>
<tr>
<td>Request example</td>
<td>“Example”</td>
<td>(N/A)</td>
<td>“Example [method] URL” (e.g. “Example POST URL”) (81x)</td>
<td>(no label)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“Example URL” (53x)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“Example usage and result” (48x)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(various labels used less than 14 times)</td>
<td></td>
</tr>
<tr>
<td>Response example</td>
<td>(no label)</td>
<td>“Response sample”</td>
<td>“Example response” (50x)</td>
<td>“JSON response example”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(descriptive custom sentence, e.g. “Returns a 200 response on success with an object representing the company”) (35x)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“Example JSON output” (29x)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(various labels used less than 12 times)</td>
<td></td>
</tr>
</tbody>
</table>

1 Table column header.
2 Table column header.
3 Table column header.
4 Information is given in distinct topics relating to groups of endpoints, e.g. “Order properties”.
5 There is only one single general list of errors (“Errors”).
6 Only one general example is given in the introductory section (labelled “HTTP request example”).
8 Sorted by frequency: “Example [JSON response]”, “This returns a response like”, “Response”, “Example [JSON response body]”, “Example response body”, “Example [topic name] [JSON]” (e.g. “Example Company [JSON]”), “Returns”, “Example output”, “Example response data”.

Table 4: Main template of market leader REST APIs according to 2017 growing trends
All components of the reference template are generally included in all samples (the only exception is Flickr, where no “Syntax” nor “Request example” are given), but some variations can be observed. Some components (mainly Syntax and Description) are often not labelled while, when a label is used, different labels are applied to the same component by different samples. When different labels are used for the same component, they can be used for specific meanings (bullet list in the table) or they are used as synonyms (listed as items alternated by “OR” in the tables, including number of occurrences, when relevant). One example of the first case is the “Status/error messages” component. Status messages are technically different from error messages, but they are usually considered together and mainly labelled as “errors”. Only Google Maps uses two different labels (“Status codes” and “Error messages”), while two samples prefer to use the generic term “response” (including Twitter, where this information is given as a single general list). An example of the second case (different labels as synonyms) is HubSpot, where a great number of different labels are used to identify Parameters, Request examples, and Response examples. Moreover, HubSpot's response examples are often labelled by different descriptive custom sentences, where relevant keywords like “returns” are used. This extreme variability could be due to different authors working during different stages of development of the API.

Two more variations can be observed; some components are included into other components (“Return data” is implicitly given in “Response example” by Twitter and Flickr), while some components are given apart from the reference pages (one general list of errors given by Twitter and WooCommerce, and one general request example given by Infusionsoft).

<table>
<thead>
<tr>
<th></th>
<th>Overall n. of available endpoints</th>
<th>N. of endpoints using custom templates</th>
<th>% of use of the main template</th>
</tr>
</thead>
<tbody>
<tr>
<td>HubSpot</td>
<td>292</td>
<td>7</td>
<td>97</td>
</tr>
<tr>
<td>Flickr</td>
<td>224</td>
<td>2</td>
<td>99</td>
</tr>
<tr>
<td>Dropbox</td>
<td>199</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Twitter</td>
<td>120</td>
<td>29</td>
<td>75</td>
</tr>
<tr>
<td>WooCommerce</td>
<td>118</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Infusionsoft</td>
<td>68</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>YouTube</td>
<td>50</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Google Maps</td>
<td>18</td>
<td>141</td>
<td>33</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1089</td>
<td>52</td>
<td>95</td>
</tr>
</tbody>
</table>

1 Six different custom templates are used, no more than three times each.
Four samples use more than one template. These additional custom templates are required to document single endpoints or groups of endpoints that have peculiar features. Table 5 shows the percentages of use of the main template.

The average percentage of use of the main template is 95%, which means that the overall use of custom templates is very limited. There does not seem to be a direct correlation between the total number of endpoints and the number of endpoints requiring custom templates; a significant frequency of custom templates is given only by Twitter and Google Maps, which both include a limited number of endpoints (120 in the case of Twitter and 18 in the case of Google Maps). It can be observed, though, that the presence itself of custom templates (irrespective of the number of affected endpoints) seems to be more likely as the number of endpoints increases (three out of four samples using custom templates have more endpoints than the median value of available endpoints, which is 119).

The main template itself is used with customised variations, which consist of additional information added both as new components (introduction, security information, notes and warnings) and as information added to existing components (details added to Description and Return data, information about parameters usage, and additional examples). Table 6 shows these additional information categories and calculates a comparative index of content complexity, where Google Maps scores 100% as including all considered units. The complexity index varies greatly, but the point is that it is always present in all samples.

<table>
<thead>
<tr>
<th></th>
<th>CC %</th>
<th>Introduction</th>
<th>Description details</th>
<th>Parameters usage</th>
<th>Return data details</th>
<th>Security</th>
<th>Notes/warnings</th>
<th>More examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Google Maps</td>
<td>100</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>HubSpot</td>
<td>85</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>YouTube</td>
<td>71</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Twitter</td>
<td>42</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Dropbox</td>
<td>42</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>WooCommerce</td>
<td>16</td>
<td>N</td>
<td>N</td>
<td>(N/A)1</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Flickr</td>
<td>14</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Infusionsoft</td>
<td>14</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
</tbody>
</table>

1 A single section with general information is given.

Table 6: Content Complexity (CC) as percentage of additional information added to the main template
Also, interaction with the user is relevant to API documentation, where typically the user wants to be able to use the API as quickly as possible. Table 7 shows that almost all samples include an interactive tool (or a dedicated hyperlink) to test the API immediately in the web browser.

<table>
<thead>
<tr>
<th>Interactive tools/hyperlinks to help test an endpoint</th>
<th>Feedback relating to each endpoint</th>
</tr>
</thead>
<tbody>
<tr>
<td>Google Maps</td>
<td>Y</td>
</tr>
<tr>
<td>Twitter</td>
<td>N</td>
</tr>
<tr>
<td>YouTube</td>
<td>Y</td>
</tr>
<tr>
<td>Flickr</td>
<td>Y</td>
</tr>
<tr>
<td>Dropbox</td>
<td>Y</td>
</tr>
<tr>
<td>Infusionsoft</td>
<td>Y</td>
</tr>
<tr>
<td>HubSpot</td>
<td>Y</td>
</tr>
<tr>
<td>WooCommerce</td>
<td>N</td>
</tr>
</tbody>
</table>

Google Maps and YouTube have added a feedback feature that allows the sending of comments about a specific endpoint. A similar feature (that is, a feedback mechanism that is available for each endpoint) is offered by HubSpot, but only as a predefined smiley face survey (using the default three emoticons for “bad”, “neutral”, and “good”).

### 4.2 Navigation

Navigation has been analysed under different aspects: how the headings of reference pages are written in the headings menu (using endpoint syntax, a noun phrase, or a verb phrase), how the headings are sorted in the headings menu (alphabetically or non-alphabetically), the presence of an index of endpoints, and the availability of a search tool. Some example of headings are: “flickr.activity.userComments” (endpoint syntax), “list” (noun phrase), “Sending and receiving events” (verb phrase). Results of the analysis are shown by Table 8.

Only two samples (Flickr and Dropbox) use endpoint syntax, while noun and verb phrases are generally preferred, usually combined, to accommodate different needs at different menu levels. Sorting of menu items is alphabetical when endpoint syntax is used, while different solutions are used to sort noun/verb phrase headings, mainly adopting a mixed approach (alphabetical for the first level of the menu, non-alphabetical for the second level of the menu).

Google Maps is the only sample to adopt both noun phrase headings and alphabetical order, but it has to be noted that its menu has
a single level and includes only 7 menu items (some of the 18 documented endpoints are grouped under a single menu item).

An index of endpoints is offered only by Twitter, although it should be noted that the headings menus of Flickr and Dropbox could be considered indexes themselves (given that syntax of endpoints is used for headings coupled to alphabetical order). In contrast, a search tool is available in four of the eight samples. Moreover, it must be taken into account that two of the samples (Infusionsoft and WooCommerce) are contained in one single scrollable page, which can therefore be searched by using the default search tool of the web browser.

### 4.3 Additional documentation sections

All API reference samples are accompanied by additional documentation sections. Table 9 shows four additional sections found in the samples and the percentage of samples that include them.
Current Practices in Web API Documentation

An overview or introduction is included in almost all samples, while Get Started guides, best practices, and tutorials are less frequently used.

5 Conclusions and Recommendations

The idea that a reference is composed of “facts” (Bellamy 2012, p.80) and the relevance of code information in API documentation could lead to the idea that this kind of documentation is quite simple to write. The use of a basic template which is largely shared by API programmers helps to encourage this idea. Moreover, REST APIs are actually based on a simple architecture, where web URLs are used to request data, and data is delivered as simple human-readable text messages. This analysis of eight REST API samples shows instead that current practices in documenting this kind of API must confront complex tasks, which need to be addressed by professional technical writers.

Firstly, the adoption of a template defined according to the basic components required by API programmers does not address, by itself, the systematic writing of an API reference. Two main issues are relevant here: terminology and template variations. Technical writers are required to adopt an appropriate and coherent terminology, especially in those cases where different meanings can lead to confusion. For example, “status messages” and “error messages” are technically different, and an accurate analysis of user tasks should be performed to help in making a decision about using a single term for both categories (like “errors”), or alternatively using two different terms. The second issue relates to the use of the template itself. The reference

<table>
<thead>
<tr>
<th>Overview/Introduction</th>
<th>Get Started</th>
<th>Best practices/Usage guidelines</th>
<th>Tutorial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Google Maps</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Twitter</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>YouTube</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Flickr</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Dropbox</td>
<td>Y</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Infusionsoft</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>HubSpot</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>WooCommerce</td>
<td>Y</td>
<td>N</td>
<td>N</td>
</tr>
</tbody>
</table>

% ADS 87 57 50 37

Table 9: Percentage of samples with Additional Documentation Sections (ADS)

1 A “Getting Started” page is included in the section “CRM Integration Guide”, but it is not considered here as it is not an additional section to the API reference as a whole.
template usually covers the majority of needs, but not all of them. Also in this case, decisions need to be made about adding more information to the existing template, using additional custom templates, or refining the existing template.

Secondly, programmers need task-oriented documentation to use the API. Almost all samples provide interactive tools to immediately test the API. Analysed samples show also that a noun/verb approach in writing headings is currently preferred, and this implies writing meaningful headings and consequently adopting a proper navigational strategy.

Finally, additional documentation, such as overviews and Get Started guides, is widely used also for documenting web APIs. These are kinds of documentation which clearly require the work of professional technical writers.

Many of these issues reflect the problems raised by so-called minimalism during the 1980s, when Carroll and others tried to build a task-oriented approach to documentation, different from the then-predominant systematic description of software functionality (systems approach). Their work has led to the formulation of eleven heuristics summarised by four principles: “Choose an action-oriented approach”, “Anchor the tool in the task domain”, “Support Error Recognition and Recovery”, and “Support reading to do, study and locate” (Van der Meij and Carroll, p.21). If we consider the initial idea of an API reference as a pure description of “facts” to be the current counterpart of the systems approach, minimalism could be applied to web API documentation to address some of the issues that have been found by the present study. By adopting a minimalist approach, a proper task-oriented strategy could be developed in order to refine the use of reference templates and consistently add communicative value to API documentation.

API documentation is an expanding field of activity for technical writers, who need direction to formulate and adopt best practices. Useful outcomes for technical writers could come from further research in the following areas: reference template components and terminology, the influence of API documentation tools on the work of technical writers, and the respective roles of API programmers and technical writers in writing API documentation.
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Margaret Grene

Measuring the Effectiveness of Using Plain English in Health Communication

Abstract

Plain English is a style of presenting information that helps readers understand it the first time they read it. The plain English movement forms part of a wider campaign, known globally as the plain language movement, and one of the key objectives of this campaign is to eliminate the use of jargon in official communications with the public. It is very relevant in the area of health literacy where critical information such as medication adherence must be communicated clearly to the lay person. This study hypothesises that plain English could play a strategic role in the promotion of health literacy in Ireland. I am inviting trainee General Practitioners (doctors) to participate in a targeted needs assessment to establish: whether they feel that health literacy is important; whether they routinely consider health literacy in patient care; and most significantly, whether they feel they have the confidence to communicate without the use of medical jargon. In addition, I am conducting user testing of plain language medical instructions—with and without medical jargon—with health information users. In this paper, I have focused on the process of designing these plain language medical instructions and the application of a set of plain language guidelines.

1 Introduction

Plain language, a style of presenting information that helps readers understand it on first reading, could become an essential tool of health literacy, where critical information must be communicated clearly to the non-medical reader. Medication users need clear guidance on how to use their medication. Moreover, in situations where medical device users need to understand procedures, plain language is especially important.

This paper describes a study designed to address this problem, focussing on newly diagnosed asthma patients, and their use of an asthma inhaler. The process of creating the instructions using plain
language guidelines and applying theories of document design is documented. Plain language and health literacy are defined, and the use of asthma inhalers is described in the following section. An overview of the study design is also provided.

2 Background and literature

2.1 Plain language
Cheek (2010) described three approaches to the definition of plain language—formula-based, elements-focused, and outcomes-focused—and debated arguments for and against each of these approaches. Formula-based definitions measure plain language using specific elements of readability, such as word and sentence length, number of syllables, and length of paragraphs. Elements-focused definitions emphasise the techniques used to write clearly—structure, design, content, and vocabulary. Plain language guidelines fall into this category. In her final analysis, Cheek concluded that, as the purpose of plain language is to communicate clearly and effectively, and the primary consideration is the needs of the audience, the recommended definition is outcomes-focused:

A communication is in plain language if it meets the needs of its audience—by using language, structure, and design so clearly and effectively that the audience has the best possible chance of readily finding what they need, understanding it, and using it (Cheek 2010, p. 5).

This definition situates formula-based (readability tests) and elements-focused (plain language guidelines) definitions as tools to support an outcomes-focused approach to plain language implementation (Cheek 2010).

The communications division of Ireland’s Health Service Executive (HSE) published a plain language guide (HSE 2018) for healthcare professionals to help them communicate clearly using plain English with patients and service users, with the assistance of the National Adult Literacy Agency (NALA). The guide recommends that clinicians:

- Be personal and direct
- Use everyday words and numbers
- Be careful with jargon
- Write using the ‘active’ tense
- Avoid abstract nouns
- Be concise
- Use relatable images
This section has presented an outcomes-focused definition of plain language, and has argued that readability tests and plain language guidelines are tools to support the implementation of plain language. The next section of this paper will consider health literacy and how it is defined.

2.2 Health literacy

At its most fundamental level, health literacy refers to the individual’s ability to understand health information as a patient in the healthcare setting, and to act on this information (Greene et al. 2017). The term ‘health literacy’ was originally used in the United States and Canada (Kickbusch 2011; Sørensen et al. 2015). It is now being used internationally in healthcare and public health contexts (Nutbeam 2008).

Sørensen et al. (2012) conducted a systematic review to obtain a comprehensive definition of health literacy encompassing 17 definitions identified in the literature. Content analysis of the 17 definitions and consultation with a panel of health experts from the European Health Literacy Consortium yielded a condensed ‘all-inclusive’ definition of health literacy, as follows.

Health literacy is linked to literacy and entails people’s knowledge, motivation and competences to access, understand, appraise, and apply health information in order to make judgements and take decisions in everyday life concerning healthcare, disease prevention and health promotion to maintain or improve quality of life during the life course. (Sørensen et al. 2015 p. 3)

Nielsen-Bohlman et al. indicated in 2004 that nearly half of the American adult population may have difficulties in acting on health information; and a Canadian Council on Learning report (2007) stated that 60% of adult Canadians do not have the ability to obtain, understand, and act on health information. The first European Health Literacy Survey reported in 2015 that of respondents in Ireland, 40% had either inadequate or problematic health literacy; of the respondents in Germany, 46.3% had either inadequate or problematic health literacy; and of respondents in Spain, 58.3% had either inadequate or problematic health literacy. Low health literacy is linked with poor health outcomes, higher hospitalization rates, greater chance of medication errors, and lower rates of medication adherence (Wali et al. 2016). There are costs to society arising from low health literacy also. For example, McNaughton et al. (2015) demonstrated that lower health literacy was associated with increased risk of death after hospitalisation for acute heart failure. Partridge (1995) noted the connection between sub-optimal management of asthma, and high rates
of hospital admissions and even asthma-related deaths. The problem of lower rates of medication adherence is a significant factor in the treatment of asthma, and this is discussed in the following section.

2.3 Asthma inhalers
Evidence in the media points to difficulties people experience using asthma inhalers. An Irish regional newspaper\(^1\) published the Asthma Society of Ireland’s assertion in May 2017 that 7,546 asthma sufferers in one Irish county with a population of 118,627 (6.4%) were not using their inhalers correctly (Flynn 2017). There is also academic evidence indicating problems with adherence to prescribed asthma medications. For example Young et al. (2016) refer to the pervasive nature of sub-optimal adherence to prescribed asthma medications. They note that ‘asthma affects nearly 26 million Americans and is associated with decreased quality of life and increased morbidity and mortality’ (Young et al. 2016 p. 1).

Gillissen (2007) explored the reasons individuals do not use inhalers properly and suggested some examples of reasons for intentional non-adherence as:
- Anxiety regarding side-effects, dependence and over-dosage
- Awkwardness of taking medication via a large volume spacer
- Denial of being asthmatic or of the severity of the illness
- Inconvenience of treatment—nonadherence is higher with inhalation therapy than with pills or tablets
- Forgetfulness, laziness, and/or carelessness.

Gillissen also suggested examples of reasons for unintentional non-adherence:
- Treatment that is too complex or too time-consuming
- Inadequate training in the inhalation technique
- Lack of understanding about the need for long-term preventive treatment—when preventive medication does not produce immediate symptom relief
- Inability to co-ordinate inhalation and actuation of Metered Dose Inhalers (MDIs).

Goeman et al. (2013) contended that the impact of asthma increases with advancing age, and that under-diagnosis and under-treatment of asthma are high in older adults. The consequence is that ‘the majority of asthma related mortality and a high level of morbidity are now experienced by those over 50 years of age’ (Goeman et al. 2013, p. 586). They also point to the acute use of health services in repeat emergency department attendance, which can be attributed to low asthma

\(^1\) The Clare Herald
related health literacy. In other words, older adults released from hospital following diagnosis of asthma or an asthma attack frequently return to the hospital emergency department because they are unable to use their asthma medication. This background provides a compelling argument for my study, which is described in the next section.

2.4 Design of the study

This research study includes the creation and testing a set of plain-language instructions for using an asthma inhaler (MDI) for patients released from hospital with a diagnosis of asthma.

Smith and Wallace (2013) assessed 50 randomly assigned participants in their use of either standard or plain-language instructions for the use of a drug self-injection pen. They also administered the Rapid Estimate of Adult Literacy in Medicine (REALM), a commonly used test of patient literacy in medical settings (Davis et al. 1991). Participants given plain-language instructions had a better understanding of how to prepare for and self-administer medication with a pen and were consistently more accurate in demonstrating how to self-inject. However, they were unable to report on patient responses compared with their health literacy level.

In another plain language and health literacy intervention, Otal et al. (2012) evaluated parent health literacy and satisfaction with plain-language education materials in a paediatric surgery outpatient clinic. With participants’ consent, a research assistant administered a health literacy screening tool, Newest Vital Sign (Weiss et al. 2005), and a plain-language satisfaction survey on fever education materials. The education material was developed by a clinical team and a patient education specialist at the hospital, and it provided general information in plain language about managing a child’s fever—written at a grade-6 readability level (US). Overall, 71% of parents demonstrated adequate health literacy, whereas 29% demonstrated either ‘limited’ or ‘possibly limited’ health literacy, which the researchers felt was probably an underestimate due to the study limitations. The plain-language educational material was well received by parents, regardless of their health literacy skills.

The design of my study is informed by these plain language and health literacy interventions. I have created a set of instructions for using an MDI and these will be user-tested for effectiveness and comprehension. Some participants will be given a set of standard instructions for comparison. With participants’ consent, I will also conduct a health literacy screening tool, Newest Vital Sign (Weiss et al. 2005), and a semi-structured interview about the instructions.
3 Creating the instructions

The initial decisions regarding the format of the instructions were influenced by practical factors. Black (2013) noted that an A5 format (similar to the American half sheet) was perceived as ‘friendlier’ than the larger A4 size, which is associated with office use. However, I felt it was important to confine all of the instructions to a single sheet for the users’ convenience. In addition, I am using a large typeface size (14pt), the recommended size for readers with vision impairment (NCBI 2018). I opted for the A4 size to accommodate the large typeface size and images. This document format has the added benefit that it can be printed on demand within a hospital or even a domestic setting.

3.1 Designing the instructions

Ganier (2004), building on the work of Schriver (1997), suggested two main kinds of strategies that people use regarding instructions. The first is to read the documents in a linear way before interacting with the equipment or device. The second is to use the instructions in an interactive way if a problem arises, or in case of doubt. The first strategy, ‘linear reading’, is used mainly by beginners who do not have knowledge of the equipment or device. Their interaction with the device is guided by the information in the document and could be called ‘instructions based’ (Ganier 2004 p. 16). The profile of my study’s target audience is any user of an asthma inhaler (MDI) who has recently been diagnosed with asthma, and is unfamiliar with the use of inhalers—beginners who do not have knowledge of the device—suggesting the need for the linear approach. This is applied in the instructions by using a clear set of steps from start to finish. The text for these steps is reworked from an existing set of instructions supplied with an inhaler, information from the website of the Asthma Society of Ireland (www.asthma.ie), and from discussion with an inhaler user.

Doak (1998) argued that patients with low literacy skills tend to take words literally. They read slowly and may sound out letters in words; skip uncommon words; have difficulty finding the key concept—their eyes wander about the page; and focus on details without the ability to prioritize them. The target user of these instructions can be of any age, including the elderly, and may or may not have poor literacy or poor health literacy. This characterisation of patients with low literacy skills has influenced the design of the instructions, and the most important step of the instructions is emphasised by
shading, and signposted in bold typeface using the words ‘This is the most important step’.

The consideration of context is critical in the successful creation of a user document (St. Amant 2017). This set of instructions is designed for new asthma inhaler users, possibly leaving hospital after their first asthma attack. The context of using these instructions is also an important consideration. Asthma is usually treated using two approaches. There is the preventer inhaler (usually brown), which is prescribed for use every day to prevent inflammation and swelling in the airways. There is also the reliever inhaler (usually blue), which gives quick relief of asthma symptoms by relaxing the muscles around the airways. This inhaler is often used without the spacer (a breathing apparatus that can be attached to the inhaler), because asthma patients need to carry one with them in case of emergency—in a handbag, in a sports bag or even a pocket, without the bulky spacer apparatus. In this context, and due to its safety-critical nature, the study will only evaluate the instructions outlining the essential steps for using the blue or reliever inhaler, without the spacer apparatus.

Gillissen’s (2007) analysis of the reasons for non-adherence to inhaler medication used some words and phrases that described emotionally stressful and frustrating situations such as anxiety, awkwardness, lack of understanding, too complex, and inability to co-ordinate. These stressful and frustrating situations are, no doubt, compounded by the symptoms asthma patients feel when they need to use their reliever inhaler such as coughing or wheezing, shortness of breath or tightening of the chest. These factors indicate the importance of another consideration in the creation of the inhaler instructions, and that is tone. It is important to imbue the instructions with a tone of ease and positivity. The title of the instructions starts with the word ‘easy’; the second heading states that ‘anyone can develop asthma at any age’; an image of a diverse group of smiling people is inserted beside this statement; the phrase ‘these steps will help’ is used in the introduction. Plain language also helps to set this tone by being personal and direct; using everyday words; avoiding jargon (instead of ‘inhale’—‘breathe in’; instead of ‘exhale’—‘breathe out’; instead of ‘Metered Dose Inhaler’—‘reliever inhaler’); writing using the ‘active’ voice; being concise; and using relatable images. Figure 1 illustrates the layout and design of the instructions.
Kimball and Hawkins (2008) take the concept of object-oriented thinking from cognitive psychology and computer science, and apply it as a metaphor to the principles of design. They use Bertin’s (1983) seven visual variables (shape, orientation, texture, colour, value, size and position) to manipulate design objects in two-dimensional design. I have selected the ‘basal’ text as one of the design objects, and applied Bertin’s variables to describe it as follows:

- **Shape**: Times New Roman typeface—traditional serif font; older readers may be more familiar with this typeface.
- **Colour**: Black—for contrast with the white background (Kimball and Hawkins 2008).
Kimball and Hawkins (2008) argued that six basic principles govern the relationship between design objects: similarity, contrast, proximity, alignment, order and enclosure. Similarity and contrast are used in the instructions to communicate a hierarchical structure in the headings. Proximity is used to show a connection between the text and the graphics. Alignment is used to reflect the connection between each step and the action it describes. Order is reflected in the steps used in the instructions, and enclosure is used through use of a coloured line signifying the end of the introduction and the beginning of the recommended steps. The following section describes how the instructions were measured for their readability and comprehensibility.

3.2 Measuring the instructions

Bauman (1997) mentions the problems with the interpretation of readability tests, citing the example of Lewis Carroll’s ‘Jabberwocky’ poem, which has an easy readability score (Mayo 1993), despite its nonsense content. Schriver details the growing realisation of several problems with using readability formulas among plain language practitioners, over the last two decades. One of the problems she cites is the fact that ‘they do not assess information design—visual and verbal content that has been designed for clarity and accessibility’ (Schriver 2017 p. 352). On the other hand, Schriver acknowledges that readability formulas have prompted writers to ‘avoid long or low-frequency words and to revise overly complex sentences’ (Schriver 2017 p. 354). Bearing these points in mind, I applied the Flesch-Kincaid readability check as a ‘rough guide’ (Cheek 2010 p. 9), before user testing, as to whether I have succeeded in the creation of a set of plain-language instructions. This check revealed the following statistics:

- Average words per sentence—15.2
- Passive sentences—4%
- Flesch Reading Ease—80.1
- Flesch-Kincaid Grade Level—5.6.

2 This refers to documents written in English and most other European languages.
De Francesco and Perkins (2012) suggested proposition density as an additional measure of comprehensibility, where propositions correspond generally to verbs, adjectives, adverbs, prepositions, and subordinating conjunctions (not nouns or pronouns). Each one is a unique unit of information in a sentence. The proposition density of a sentence is measured in a simple calculation (number of propositions divided by number of words in a sentence). De Francesco and Perkins argued that dense propositional load might create a cognitive overload for some readers. Miller (1956) asserted that a person can hold from five to nine pieces of unrelated information in short-term memory. However, Cowan (2001), in more recent research, argued that this number should be as low as four. A measurement of the proposition density of the core sentences of the asthma inhaler instructions showed an average of three propositions per sentence.

3.3 Reviewing the instructions
Rudd et al. (2005) developed a glossary of asthma terms to improve communication between patients and healthcare providers, and to help patients understand the materials commonly used in neighbourhood health centres. An evaluation of the glossary was conducted six months after it was posted on a website, and the respondents offered positive comments on the materials, specifically regarding the level of information, clarity, and useful translation of key asthma words and terms. This study was a collaborative and inclusive programme, involving inputs from users, technical experts, and health educators. Similarly, Black et al. (2013) developed a questionnaire to obtain pain symptoms and experience, for use by people with dementia or their carers, at hospital admission. Development of this questionnaire involved informal feedback, trials, end-user inputs, and re-trials.

Based on these examples, this study incorporates similar stages of development with initial academic feedback, review by a plain language expert, an expert from the Asthma Society of Ireland and a respiratory treatment expert from the national Health Services Executive (HSE).

3.4 Testing the instructions
User testing of the instructions will be conducted with people from the general population, people with limited literacy and non-native speakers of English, and people who are aged 65 years or older. Ethical approval has been granted for this testing, and participants will be asked for their consent prior to the testing, which will be conducted in the following way.
Step 1: I will carry out a standard health literacy test called the Newest Vital Sign (Weiss et al. 2005) with each participant; this takes approximately five minutes.

Step 2: I will ask each participant to read through the asthma inhaler instructions (either a plain language version or a standard version, randomly chosen) at their own pace and then demonstrate the use of the inhaler using a sample inhaler (with no medication). I will record the number of correctly performed steps using a rating checklist (‘correct’ and ‘incorrect’).

Step 3: Finally, I will complete a short user assessment of the set of instructions in a semi-structured interview format with each participant.

4 Conclusion

This study is being carried out to establish if using plain language can improve the comprehensibility of complex health information and procedures, especially for low-literacy patients. Evidence in the media and academic evidence indicate sub-optimal use of their inhalers by asthma patients. In response to this, principles of document design, as well as a set of plain language guidelines, are applied to the development of a set of instructions for the use of an asthma inhaler. These instructions have been measured, and will undergo a collaborative review process with plain language, health literacy and medical experts before being tested with the intended user groups. Measurement of health-literacy levels in these user groups will bring a deeper understanding of the results at the evaluation stage.

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How the Skills of the 21st Century Technical Communicator are Valuable When Designing Assessment Briefs in Higher Education

1 Introduction

The centrality of assessment in higher education is widely acknowledged. While it is possible for students to avoid the effects of poor teaching, in order to graduate, they cannot avoid the effects of poor assessment (Boud 1995). “Every assessment task is an exercise in communication” (Dunn et al. 2004, p. 83). This paper will outline how the skills of the 21st century technical communicator can be used in designing assessment in higher education.

To become a member of their academic field, students must learn an academic discourse and become assessment-literate. The European Qualifications Framework (EQF) is the bridge between national qualifications systems. Each of its eight reference levels are defined in terms of learning outcomes (European Centre for the Development of Vocational Training 2018). The EQF is implemented in each country through a National Framework of Qualifications (NFQ). In Ireland, this has resulted in the widespread articulation of programme and module learning outcomes, which has increased the need to become assessment-literate.

Becoming assessment-literate can be challenging if students encounter differences in the approaches and interpretations of academics in different disciplines and sometimes within the same discipline. This disparity requires students to adapt to individual modules (Nesi and Gardner 2006), which is especially significant in multidisciplinary programmes. The language of assessment, in particular, understanding the language in assessment briefs, is often a concern for students (Sloan and Porter 2010). An assessment brief is “the written instructions provided to communicate the requirements and expectations of non-exam assessment tasks” (Gilbert and Maguire 2014). Interpretation is also a concern in technical communication. As Schriver (2013, p. 388) explains, “experienced technical communicators recognize
that they may perceive content differently than their audiences, who typically bring different knowledge, background, experience, or culture to bear during interpretation”.

The growing range of learning outcomes, requiring a variety of assessment instruments, has resulted in more complex assessment instructions (Gilbert and Maguire 2014). The evolution to an increasingly digital environment has expanded the range of assessment instruments available in higher education; potentially resulting in students having less opportunity to master any particular type of assessment. Added to the essay and examination are assessments such as blogs, websites, wikis and e-Portfolios. Social networking, wikis, blogging and web designing/editing are also commonly used by technical communicators (Blythe et al. 2014, pp. 276-277). These assessments require the development of particular assessment briefs. The quantity of assessment has also increased due to modularisation. Coupled with a diversifying and increasing student population, this has highlighted the importance of assessment literacy. The design and transmission of assessment briefs is, therefore, paramount.

This paper will argue that the skills of the 21st century technical communicator can be adopted by the assessment designer to enhance the communication of assessment briefs. The key findings of a PhD study, designed to explore the communication of assessment, will be presented.

2 The skills of the 21st century technical communicator

A changing work environment and advances in telecommunications require new skills. The technical writer is no longer just a writer (Brumberger and Lauer 2015).

To work as part of a team, the technical communicator must develop excellent collaboration skills (Rainey et al. 2005; Lannon and Gurak 2011; Markel 2012; Mehlenbacher 2013). Burnett et al. (2013) define collaboration as “an intentional, sustained interaction towards a common goal” (p. 454). Collaboration skills are important in the 21st century workplace, especially in workplace writing (Burnett et al. 2013). Mehlenbacher (2013, p. 188) explains: “Contemporary technical communicators, however, rarely work in isolation and therefore spend a considerable amount of time and energy communicating their contributions for others”. Teamwork is essential where a project would benefit from multiple perspectives (Burnett et al. 2013) or where a project is too large for an individual to complete.
In 2005, the ability to write clearly for a specific audience and to analyse users’ needs was highlighted as a key skill by Rainey, Turner and Dayton. Rainey et al. (2005) also stated that the technical communicator already possessed the skills required by the emerging area of single sourcing.

Subsequent studies identified communication skills (Lanier 2006), instructional design (Schriver 2013) and written communication and editing skills (Brumberger and Lauer 2015) as key competencies of technical communicators.

The following section is a discussion of how these skills can be harnessed for the effective communication of written assessment briefs.

3 PhD study: Investigating the communication of written assessment instructions

The aim of this study was to explore how academics, in higher education, should design written assessment briefs to maximise the communication of assessment requirements, standards and instructions. These briefs adhered to principles of good practice in assessment, utilized communication techniques and drew from Gilbert and Maguire’s (Oxford Brookes University) guidelines for the effective communication of assessment briefs.

3.1 Methodology

This mixed-methods data gathering was conducted at the University of Limerick over a one-year period from June 2016 to June 2017. The methodology consists of three phases.

1. The first phase involved the use of two online questionnaires: one aimed at academic staff and the other at students. The main purpose of these questionnaires was to inform a baseline report on the frequency of assessments, the range of assessment instruments and the perception of academics and students on the effectiveness of assessment briefs in communicating assessment requirements, standards and instructions.

2. The intention of the second phase was to identify the structure and content of existing briefs. However, as I could not access these briefs, I conducted an analysis of the assessment briefs, used during phase three, prior to any changes made for the study.

3. The final phase involved designing assessment briefs with one academic from each of the four faculties in UL:
   – Faculty of Education and Health Science
   – Faculty of Arts, Humanities and Social Sciences
I conducted interviews with academics and students to explore their experiences with these types of assessment briefs.

4 How can the skills of the Technical Communicator be adopted by the Assessment Designer?

Written communication dominates the assessment process, both the transmission of assessment briefs and the product that the student produces. Considerable time and effort is invested by higher education into the assessment process. Yet there is little information to “support the purposeful analysis and design of individual assessment tasks” (Hughes 2009, p. 554). The potential for technical communication to enhance the communication of written assessment briefs is discussed below.

4.1 Collaboration skills

According to Lannon and Gurak (2011), the most common features of technical communication are that documentation is “reader-centered, accessible, and efficient” (p. 7) and is “often produced by teams, and delivered in both paper and digital versions” (p. 7). In higher education, assessment documentation can be designed by one academic or by a team of academics. Having worked in online distance education for twelve years, I had experience of working collaboratively with distributed discipline-specific academics in designing assessments. A consistent look-and-feel was required for all assessment briefs. Collaboration skills were required to ensure consistency across the programme.

Gilbert and Maguire (2014) recommend that another academic, preferably from a different subject area, reviews the assessment briefs “as the designer of instructions, due to their familiarity with the task and their expertise in the field, is not always best placed to evaluate the brief’s readability”. The advantages of teamwork in developing the assessment brief should increase the communication effectiveness of the brief. In this study, designing the assessment brief was a collaborative task involving both face-to-face meetings and email correspondence.
4.2 Writing or editing skills
A primary purpose of technical communication is “to enable people to perform a task or follow a procedure” (Lannon and Gurak 2011, p. 8). This is similar to the aim of the assessment brief, which is to enable students to complete an assessment task. A reader-centred document focuses “on what people need to learn, do, or decide” (Lannon and Gurak 2011, p. 7). The purpose of the assessment brief should be to communicate what the students needs to do.

The technical communicator must produce documents that are easy to navigate and understand. The reader expects “to find the information they need and to get questions answered clearly” (Lannon and Gurak 2011, p. 7). On reading the assessment brief, students should find the information they need. For a document to be efficient and accessible, it should include: worthwhile content, sensible organization, readable style, effective visuals, effective page design, and supplements (Lannon and Gurak 2011, p. 7). Information that is organized sensibly guides the reader through the material and emphasizes important information. Gilbert and Maguire (2014) highlight the importance of Ordering (presenting individual components of the brief in the order in which students will logically work through them) in the assessment brief. When an assessment involves stages or complex processes, Sequencing is an important feature that involves writing instructions to “mirror the order of the stages the students will go through when doing the assignment” (Gilbert and Maguire 2014).

Seven of the eight criteria Markel (2012) recommends for measuring the quality of technical communication are relevant to assessment design. These include clarity, accuracy, comprehensiveness, accessibility, conciseness, professional appearance and correctness. The technical communicator aims to produce a document that “conveys a single meaning the reader can understand easily” (Markel 2012, p. 13) and conveys “information to a particular audience so that they understand something or carry out a task” (p. 14). To avoid confusion and annoying your reader, a document must be accurate. To achieve accuracy, the document must be objective and unbiased. A comprehensive document contains “sufficient detail so that readers can [...] carry out any required tasks. It refers to supporting materials clearly and includes them as attachments” (Markel 2012, p. 14). To communicate the assessment task, the assessment brief must be comprehensive. It should provide the information needed for students to complete the task, without the need for additional instructions (Gilbert and Maguire 2014). Supporting documentation was included in an appendix, or a hyperlink was provided. A document should be accessible to enable readers to find the section(s) they need. The assessment
brief should be accessible to all students. The use of headings and sub-headings aids the student in finding the sections of the brief that are required. Gilbert and Maguire (2014) recommend the use of “formatting and font tools such as bold, italics, shaded text” to identify key areas of the brief. Gilbert and Maguire (2014) also recommend *Indexing*. An indexing system aids communication between students and academics, as they can refer to specific sections of the brief. For technical communicators, a document should be concise while still being usable to the reader. The assessment brief should be as concise as possible “while maintaining clarity and comprehensiveness” (Gilbert and Maguire 2014). Correctness is an important measure of quality in technical writing. It is important that assessment briefs are correct. Correct spelling, grammar and punctuation influences students’ perception of the quality of the overall instructions. As the reader will form an impression of the document and the writer, it is important to adhere to professional format standards. A professional document “adheres to the conventions of grammar, punctuation, spelling, mechanics, and usage” (Markel 2012, p. 14). Students form an impression of the assessment and the assessment designer (often the lecturer) based on the quality of the assessment brief. In order to produce high-quality assessment briefs, a professional standard should be adopted.

For a document to be effective, the technical communicator must conduct a systematic analysis of their audience and “the ways in which they will use” (Lannon and Gurak 2011, p. 17) the document. Writing for a particular audience and its related activities is widely recognized as essential in technical communication. The assessment designer should be cognizant of what information their audience (the student) requires and how the student will use the assessment brief. As assessment designers are often required to produce assessment briefs prior to meeting the students, it may be impossible to survey the cohort to determine the specific needs of that group. Generally, the student will consider the marker/academic as their target audience. When an academic is not the intended audience, the assessment designer should include information about the target audience in the brief. Articulating this information allows students to select the “appropriate text design and language style” (Gilbert and Maguire 2014) for that audience.

Determining the correct tone and implementing an effective tone (Rainey et al. 2005; Lannon and Gurak 2011) are also important skills. Tone is an important aspect of assessment design as an inappropriate tone can trigger a negative response from students and
“adversely affect their processing of the instructions since their processing of information is influenced by their emotional state during reading” (Gilbert and Maguire 2014). In designing the briefs for this study, the following were avoided: overuse of “do” and “don’t”-type imperatives, all capitals, words such as will and must, stressing the difficulty of the assessment or the high-stakes nature of assessment and idioms that had a negative emotional connotation.

4.3 Instructional Design

Schriver (2013) identifies information design as an important aspect of technical communication. A technical communicator “will need to be concerned with how to present your message visually and verbally” (Schriver 2013, p. 386). Information design involves graphic design, writing, instructional design, and user experience (Talbott 2017) skills.

Instructional design was included as a tertiary competency by Rainey et al. (2005). “Instruction is a set of events that affect learners in such a way that learning is facilitated” (Gagné et al. 1992, p. 3). Instructional design is the planning and design of instruction. A key activity of instructional design is the development of learning objectives (Gagné et al. 1992). Learning objectives created by a team are more effective than those created by the individual (Lee and Owens 2000, p.46). Lee and Owens (2000) identify the formulation of learning objectives as essential to developing effective solutions. While Lee and Owens discuss learning objectives in the context of course design, the focus of this research was on assessment design. The development of learning objectives is a crucial step in the assessment process.

Design features such as typography, spacing and colour can be used to increase the readability of a document (Markel 2012). According to Markel (2012, p. 8), technical communicators use these features to “make the document look attractive and professional”; “help readers navigate the document”; and “help readers understand the document”.

Chunking information is an important aspect of technical communication, as it is easier for people to understand smaller units of information rather than presenting it all together (Markel 2012), and it is visually more appealing (Lannon and Gurak 2011). Chunking involves splitting information into “discrete, digestible units, based on the users’ needs and the document’s purpose” (Lannon and Gurak 2011, p. 206). Chunking can be achieved by using headings, sub-headings and white space (Lannon and Gurak 2011). Chunking is also beneficial when designing material in higher education. In particular,
in a modular structure, chunking can be used to create re-usable, discrete units of course material. Gilbert and Maguire (2014) recommend that relevant information is chunked together or assembled into sections. The use of headings, sub-headings and sub-section indexing is used to distinguish and identify these sections.

4.4 Single Sourcing
Rainey et al. (2005) suggested that technical communicators had the competencies required for single sourcing. Single sourcing involves “building modular documentation that can be re-used in different formats” (Rainey et al. 2005, p. 334). In education, course designers can create learning objects that can be re-used in different modules.

Single sourcing involves creating one single document that can be published in multiple formats. The technical communicator commonly produces documentation that will be delivered in both paper and digital versions. “Studies show that people tend to remember more when they acquire new content visually and verbally, rather than just visually or just verbally” (Schriver 2013, p. 389). There are a variety of different modes for the delivery of assessment documentation in higher education. The ubiquitous influence of technology in higher education has led to the widespread use of virtual learning environments (VLEs). Assessment documentation can now be delivered to students through the VLE. In this study, it was common for students to be presented with both visual and verbal assessment instructions. Students were frequently given their assessment briefs as a Microsoft Word document (64%) or as an Adobe PDF document (49%). In most cases, the assessment instructions were also discussed during class (67%) supported by presentation slides (61%). Two of the four lecturers who participated in the third phase of this study provided students with both a hard copy and soft copy of the assessment brief. The assessment designer could create multiple formats (e.g. online version and print version) of the assessment brief from a single source. Multiple versions of the assessment brief may also be required by the various stakeholders such as students, tutor, or external examiner. The functionality of single sourcing could enable the assessment designer to create multiple versions of the assessment brief from one single source and publish these versions in different formats. One potential area for creating multiple versions of the assessment brief is within a mixed-ability class. If students entering a module have different prior experience or different skills, it may be worthwhile to create different versions of the assessment brief to meet the individual needs of the students: a novice and advanced version.
Having discussed the overlap in skills required by the technical communicator and the assessment designer, the following section details, briefly, the preliminary finding of a PhD study designed to investigate if effective communication techniques enhanced the communication of assessment briefs.

5 Findings

The academic staff were positive about working as a team to develop the assessment brief. They all felt that having a person review the brief increased the clarity of the brief and highlighted any errors prior to releasing the brief to students. “It was really nice to have a second person looking at the assessments and kind of giving advice and yeah, it’s quite nice actually to have that” (Academic E). One participant found the experience so beneficial that, having taken part in the pilot session, he requested to be involved in the overall study. This participant sought advice on subsequent assessments and shared the experience with a colleague, who adopted this approach to assessment design.

The comprehensive assessment brief reduced confusion amongst students, which reduced student queries. The academics also felt positive about the level of detail in the briefs. “I suppose, a degree of clarity and a level of information which I would never get around to writing up” (Academic B). Two of the lecturers adopted this approach in designing their other assessment briefs. The comprehensiveness of the brief reduced student anxiety around completing the assessment task. Students felt less confident in their answers to assessment tasks when briefs did not provide any indication of what the answer should be. A lack of clarity around the scope of the assessment task caused confusion amongst students. Less-developed briefs led students to question the lecturer’s expectations. They felt that more clarity would explain what the lecturer was expecting and how much detail was required in their answers. This lack of clarity was important when the format and structure of the intended assessment was different to the students’ prior conception. For example, one group of students were asked to create a poster; however, the structure of this poster was different to their previous experience of posters.

The assessment briefs provided clarity around referencing, late assessment submission, assignment submission due dates, format of submission, formatting within assessment answers and precise timing. This clarity reduced student queries. Students reported that this level of clarity also reduced the anxiety they often felt when complet-
ing an assessment task. Subsequently, the queries that did arise were an exploration of the assessment task itself. Providing this information reduced anxiety amongst students. When students were not provided with this information, they were unsure what the requirements were and therefore followed the requirements from other modules, which caused feelings of uncertainty for students. “But it’s nice to have a reassurance that yes, that is what you’re supposed to be doing” (Student-Mairead).

Being able to access the information they needed, from one source, was considered a positive aspect of the assessment brief: hyperlinks to additional or supporting information were included in the brief. An incomplete assessment brief, where subsequent requirements were added, was linked to a negative experience for students. Having all of the information needed to complete the assessment contained within one document was a positive aspect of the assessment brief. “I absolutely loved. I loved having everything here” (Student-Clara). It also reduced feelings of anxiety. “You know, where are the specifics and all the extras that I need? And that’s where you get stressed” (Student-Mairead). This allowed students to use the assessment brief as a reference guide and checklist, especially in relation to referencing and formatting. “So to have all of that information in one place was really, really handy. Because on the day before, the day it’s due, to just be able to quickly scan over this and make sure I have that, I have that, I have that. It just kind of is a lot better, I think” (Student-Amy). It also meant that students did not have to search within a larger document for information relating to the assessment, for example, referencing or formatting instructions. Students felt that they would not miss any requirements by having all of the information within one document. “But it’s just to have it there. So you know, you can’t go wrong by missing a detail” (Student-Megan).

Students were positive about the ordering of components within the assessment brief. These components were ordered according to how a student would work through the assessment, for example, the assessment task was presented at the beginning of the brief, with submission requirements at the end of the brief.

Megan: It was handy to just print off ‘cause you have the question there. Like you’ve all the immediate details that you need on the top so like the word count, the due date, the time and, the percentage...
Clara: Exactly.
Megan: …and then the question straight after it and then afterwards you have the details so it’s like, I don’t know, it’s like, the stages that you need it in…
Mairead: Uuhh.
Clodagh: Yeah.
Megan: …it’s just kind of there.
The importance of effective information design was evident in the use of headings and sub-headings to distinguish sections, and the use of bullet points. One respondent was particularly positive about the impact of white space between sections. It was seen as an effective way to distinguish sections. “There’s good white space between the sections between evaluation criteria for instance there and referencing, between referencing and plagiarism, and it makes it very, very clear what the sections are on that particular page ahem, under submission requirements, there’s the bullets, the sub-bullets” (Academic B). The use of bullet points enhanced the readability of the briefs for students. “For other assignments it’s not as clear. Whereas, this was quite clear, what she wanted. And you know bullet pointed or information” (Faye).

For two of the four assessments I was able to choose the font for the assessment brief. I selected Candara, which is a humanist sans-serif font. This “friendly and readable” (Jacobs, 2017) font was selected to enhance the readability of the assessment brief in an online environment. One of these academics felt this font was effective in making the assessment ‘stand out’. “It might mean nothing but maybe it draws attention. […] you never come across that font and it’s slightly different and I don’t know if, just even from a design perspective, does having that different font, that student haven’t come across before, they never see in assignment instructions, … And I wonder with this is it just because it’s presented in a very different way. So, it stands out, from the traditional type that you will see or you’re likely to see as your assignment” (Academic B).

Students and academics discussed the conciseness of the assessment briefs. Briefs ranged from one page to sixty-seven pages.¹ The general consensus was that, even if all the information was required, students would prefer shorter assessment briefs. “Somehow shortening it without taking anything out” (Academic C). Suggestions for how this could be achieved were dependent on consistency across modules within a programme of study. If consistency was achieved, common information could be removed from individual assessment briefs and located within a programme or school-wide document.

Students voiced concern regarding a lack of consistency in the level of detail provided in assessment briefs and lecturers’ expecta-

¹ The length of the brief correlated to the type of assessment. The one-page brief was used for an experiment. Students were required to write a formal report of a particular experiment. The brief contained the name of the experiment and relied on reference to the larger sixty-seven-page document. The longer document contained specific examples and templates of formal reports.
tions in referencing and formatting. “’Cause it can be difficult sometimes if one lecturer gives you loads of information and another one gives you nothing at all. Or some of them are really strict, with the format and things and other ones don’t really care. So, it would probably make it easier for us if we just knew, this is the way the [redacted] school works” (Student-Amy). A consistent approach amongst lecturers to elements such as referencing, bibliography, formatting, submission requirements and late submissions would reduce anxiety amongst students. “I’m always afraid sometimes that they’ll take say referencing really seriously and you’ll lose marks for it where other times you won’t lose marks at all” (Student-Amy). “Ahem, so, and it doesn’t change between modules. It’s just like. I’d be handy if there was essential reading for [redacted] students with, you know, these kind of guidelines with the font type, the referencing style, you know, just basic, like, bibliography, footnotes, you know, so a minimum standard for all modules” (Student-Megan).

6 Conclusion
Utilizing the skills of the technical communicator can enhance the communication effectiveness of assessment briefs. Comprehensive briefs that contain all of the information needed to complete the task were considered beneficial by students. It also reduced feelings of anxiety and promoted confidence in students. Working collaboratively when designing the assessment brief was considered a valuable exercise by the academics involved. As students highlighted the need for consistency at programme- or school-level, the potential to work collaboratively to develop assessment briefs and a level of consistency amongst academics is a recommendation from this study. Achieving concise and comprehensive assessment briefs, while ensuring clarity, is an important consideration for assessment designers. Collaborating with colleagues provides opportunities to reduce the length of briefs while fostering consistency across modules. The assessment designer can harness the skills of the technical communicator to enhance the communication of assessment briefs.

7 References


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