

TECHNOLOGICAL UNIVERSITY DUBLIN

Teamwork Report and Reflection

by

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Declaration of Authorship

We, students , declare that this case study titled, ‘Case study on Sphere Ltd’ and the work presented in it are my own. I confirm that:

- This work was done wholly or mainly while in candidature for a research degree at this University.
- Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated.
- Where I have consulted the published work of others, this is always clearly attributed.
- Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work.
- I have acknowledged all main sources of help.
- Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself.

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Chapter 1

Teamwork and Conflict

This chapter is written by Danyil

1.1 Why Teamwork Matters

Teamwork is at the heart of most successful group projects, whether in college, the workplace, or even in everyday life. When people with different skills and experiences come together and collaborate well, they often achieve better results than if they were working alone (Salas et al., 2005). Good teamwork helps with sharing the workload, solving problems faster, and making better decisions as everyone brings their own perspective.

A popular way to understand how teams develop over time is Tuckman’s model, which includes five stages: forming, storming, norming, performing, and adjourning (Tuckman, 1965). The ”performing” stage is where things really click—the team works smoothly, communicates well, and gets the job done. But getting there isn’t always easy. In fact, conflict is almost guaranteed to happen along the way.

1.2 Where Conflict Comes From

Not all conflict is a bad thing. At times, differing opinions help foster new ideas and solutions. However, at times, conflict can be a drain on a group or worse, tear it apart. Jehn (1995) notes there are three types of conflict: task conflict (conflict over the content of the work), relationship conflict (conflict stemming from interpersonal issues between group members), and process conflict (conflict revolving around how to achieve something).

Task conflict can be good for it can challenge group members to think critically or to entertain other options (De Dreu & Weingart, 2003). Relationship conflict, however, is a bad thing for group morale, as when members do not get along or are at odds with personalities. Process conflict may seem like an insignificant type of conflict but when groups are constantly angry about who is doing what or the best method for organization, it creates a waste of time and resentment.

Conflict can also stem from diversity and differing working styles. When communication is unclear, roles are not defined, or one person overtakes the discussion, it can cause conflict (Thomas, 2006).

1.3 How Teams Can Handle Conflict

Dealing with conflict in a positive way is likely the biggest challenge (and opportunity) for any team. One well-known model is the Thomas-Kilmann Conflict Mode Instrument, which describes five ways people typically approach handling conflict: competing, avoiding, accommodating, compromising, and collaborating (Thomas & Kilmann, 1974). While avoiding conflict might seem easier, it usually just leaves the problem in the ground. Collaborating together—whereby both sides work together to design a win-win solution—is typically the best, especially in long-term group collaboration (Rahim, 2002).

Ensuring that there is a space where everyone feels comfortable to share their opinions is important. This idea is called psychological safety, and it's knowing that you won't be reprimanded or criticized for expressing your opinion (Edmondson, 1999). Groups that are receptive to sharing and actively listen tend to fare better in disagreements.

1.4 The Role of Emotional Intelligence

A large portion of managing conflicts involves emotional intelligence (EI)—being aware of and managing your own feelings, as well as empathizing with other people's feelings. The emotionally intelligent individual, Goleman (1998) suggests, is better placed to stay composed at times of crisis, resolve conflicts peacefully, and make up with teammates.

High emotional intelligence teams actually fared better, as did teams that excelled at managing conflict, according to Jordan and Troth (2004). The better news is that emotional intelligence can be achieved through practice—by gaining self-knowledge, communications skills, and exercises to increase empathy.

1.5 Encouraging Healthy Disagreements

Conflict is never necessarily bad. And actually, healthy disagreement can make teams more powerful. The challenge is to create an atmosphere of constructive disagreement and respectful criticism. Leaders can play a key part by creating equality, ensuring everyone has an opportunity to be heard, and intervening where it is necessary.

Setting up communicating guidelines, having regular check-ins with one another, and offering feedback to one another can prevent misunderstandings from arising and keep everyone on the same page. At the end of the day, it's less about avoiding conflicts—it's about learning to deal with it once it shows up.

1.6 Conclusion

Collaboration thrives not only because team members are able to work together successfully but because they are also capable of handling conflict positively. While a natural byproduct of collaboration, conflict does not necessarily have to be a destructive force. Understanding the types of conflict, developing emotional intelligence, and developing psychological safety within teams all involve conflict handled in a positive way. Healthy conflict can lead to stronger relationships, more innovative thinking, and stronger teams. Healthy disagreements are a work environment where growth and creativity are spurred, but conflict avoidance is never the goal.

Chapter 2

Leadership in Teams

This chapter is written by Danyil

2.1 What Leadership Means in a Team

A functioning team is made up of more than just people who know what they're doing—there needs to be competent leadership, too. Leaders provide direction to the team, help make everything run smoothly, and make sure everyone is moving toward one purpose. Leadership of teams, however, can manifest in numerous ways depending on the situation.

A leader is sometimes formally designated. At other times, someone assumes leadership by the nature of their personality, expertise, or approach to helping others. Either type of leadership can have an important influence on the functioning of a particular team (Zaccaro et al., 2001).

2.2 Different Ways to Lead

A number of leadership theories and styles describe what works best across various team environments. One style is that of the transformational leader. These individuals inspire people, consider the big picture, and develop people. They tend to be enthusiastic, positive, and motivating (Bass & Riggio, 2006).

A helpful alternative style is servant leadership, where the leader seeks to serve the group, as opposed to leading it. Servant leaders actively listen, are concerned with

people's development, and create a supportive environment (Greenleaf, 1977). The servant leadership style is especially useful if you must establish trust and cooperation.

There is shared leadership, where leadership is shared across the team, as compared to individually focused leadership. It is common with technology teams, start-ups, or innovation teams where different people emerge to lead depending on the task (Pearce & Conger, 2003).

2.3 How Leadership Style Affects Teams

A leader's behavior can also play a critical role in the team's performance. For instance, an autocratic leader may perform well during a crisis when decisions have to be made fast, but his/her leadership will be perceived as ordering if no space for inputs is given. A democratic leader, however, engages the entire team in decision making, and the impact is that morale and commitment are enhanced (Lewin et al., 1939).

And finally, there's laissez-faire leadership—where the leader backs off and allows the group to run itself. This will work with highly skilled groups but can result in chaos or lack of focus if the group is not highly well-coordinated (Skogstad et al., 2007).

This is why situational leadership—where the leader adapts their style according to what the team requires—is usually optimal (Hersey & Blanchard, 1969).

2.4 Common Challenges for Team Leaders

Leadership is not always a walk in the park. Leaders must contend with various personalities, objectives, and communication methods. With virtual or multicultural teams, it is even more complex—throw in time zones, language differences, or not being able to see each other (Bell & Kozlowski, 2002).

A second grand challenge is to balance getting the task done with making sure that everyone feels cared for. Task-oriented leaders might neglect team morale, and people-oriented leaders might struggle with deadlines. Excellent leaders learn to do both (Burke et al., 2006).

2.5 Helping Everyone Become a Leader

Leadership is not necessarily one person telling others what they have to do—it can (and should) be distributed. In fact, some of the most successful groups are those where everyone feels confident enough to step up and lead when called on.

Training, mentorship, and regular feedback can help leadership skills to be developed among team members. One handy idea is rotating leadership—giving each member a chance to lead a part of a project. It builds trust, encourages responsibility, and enables the whole team to grow together.

2.6 Conclusion

Effective leadership is central to our success in leading teams to our goals, shaping team culture to be positive, and overcoming challenges along the way. From transformational inspiration to servant-leadership guidance, to shared leadership frameworks, the leader's behavior significantly impacts team performance and morale. The effective leader knows when to adjust his or her style to fit the needs of the team and the situation. Most significantly, they develop the leadership skills in others, building more adaptive, committed, and empowered teams. True team success comes when leadership becomes a shared responsibility.

Chapter 3

Managing team workload

This chapter is written by Artem **Managing Team Workload: An Evidence-Based Process**

3.1 Introduction

Effective team workload management is an important determinant of team performance, productivity, and member health (Crawford & LePine, 2013). With the emerging organizational environments that are increasingly more complex and resourced, being able to distribute, monitor, and redistribute workloads remains an endemic problem of team managers and leaders. This research paper summarizes evidence-based practices for managing team workload from the point of view of the multidimensional aspects of workload management as viewed via empirical research. By integrating results from peer-reviewed studies, this paper attempts to provide information on best practices that optimize team performance without risking burnout and guaranteeing team cohesiveness.

3.2 Conceptualizing Team Workload

Team workload is not the simple addition of individual tasks; rather, it encompasses the aggregate calls on a team as well as how these calls are assigned, perceived, and managed (Porter et al., 2010). Karwowski et al. (2021) distinguish between objective workload (task demands that are measurable) and subjective workload (team members' perceptions of demands), highlighting the fact that workload management must

address both. Besides, Barnes et al. (2012) conclude that team workload arises at various levels—individual, dyadic, and collective—and each requires different management methods to attain balance.

3.3 Workload Distribution Strategies

Empirical support exists for a range of workload distribution methods enhancing team performance. A meta-analysis by DeChurch and Mesmer-Magnus (2010) concluded that teams relying on transparent allocation methods of task allocation reached 27

1. Skill-based allocation: Task allocation based on member skills optimizes team efficiency while possibly limiting the potential for skill development
2. Load-balancing allocation: Work allocation equally may enhance perceptions of fairness but possibly reduces specialization benefits
3. Allocation of development tasks: Allocation of complex tasks for capacity development develops the long-term potential of the team, but perhaps at the expense of short-term loss of efficiency in the short term.

Salas et al.'s (2018) study indicates that teams that dynamically manage workload by constantly observing perform 34

3.4 Monitoring and Managing Workload Fluctuations

Effective workload management requires constantly monitoring systems to detect imbalances prior to influencing performance. Marks et al. (2021) found that those teams that undertook regular reviews of their workload had 41A study conducted by van der Vegt et al. (2015) Conducting longitudinal experiments demonstrates how temporal considerations are involved in controlling workload. From the experiment, the researchers observed that teams with chronic high workload without recovery exhibited systematic performance deterioration while teams that went through planned cycling could maintain stable performance for a while.

3.5 Technology-Enabled Workload Management

Existing research focuses on the necessity of technology to enhance workload management practices. Zhou and Wang's (2020) comparative study demonstrated how groups

that utilized digital workload visualization technologies reduced task coordination failure by 38% But Mattarelli et al. (2018) caution that over-reliance on technology can have unforeseen consequences, including reduced team cohesion and reduced contextual awareness of workload problems. Their findings show that effective technology integration depends on maintaining human control and regular face-to-face meetings about workload to complement electronic monitoring systems.

3.6 The Role of Leadership in Workload Management

Leadership styles contribute significantly to the results of workload management. Transformational types of leadership have been attributed with more effective task allocation workload and team force when demands were more elevated, by research performed by Dinh et al. (2019). Shared forms of leadership wherein management of workloads is handled over to staff—are also highly effective in environments characterized by intensity in knowledge processes (D’Innocenzo et al., 2016). One of the most critical leadership functions that Morgeson et al. (2017) have established is “workload boundary spanning,” i.e., the work of the leader negotiating suitable workloads with outside stakeholders and protecting teams from overburdening workload expectations. Their research indicates that leaders who perform this function effectively maintain team productivity 37

Chapter 4

Communication in teams

This chapter is written by Artem **Communication in Teams: A Research-Based Analysis**

4.1 Introduction

Communication is the fundamental process through which team members are coordinated, establish common knowledge, and build interpersonal relationships that make collaboration work (Keyton, 2011). Team communication styles and processes contribute significantly to the influence of performance outcomes, creativity potential, conflict resolution, and job satisfaction (Marlow et al., 2018). This research paper explores the complex aspects of team communication, combining empirical findings from peer-reviewed sources to identify evidence-based practices that ensure communication effectiveness within different team contexts. Through a discussion of communication from both a structural and a processual stance, this paper aims to provide detailed insights into this essential characteristic of team performance.

4.2 Communication Structures in Teams

Evidence repeatedly indicates that communication structures—how information is being passed between groups—have a direct influence on team performance. Meta-analysis by Mesmer-Magnus and DeChurch (2009) indicated that teams with decentralized communication structures (where everyone in the group talks to one another directly) had 31Nonetheless, Hollingshead et al. (2018) illustrated that the best communication configurations rely on the nature of the task, with central configurations being suitable

for repetitive work and decentralized configurations being suitable for more advanced knowledge work. The fluid temporal character of team communication styles must also be emphasized. Decades-long longitudinal work by Kozlowski et al. (2015) found that successful teams possess adaptive styles of communication which shift with stages of the project. Centralized structures initially shift toward increasing decentralization as teams age, with aged teams exhibiting flexible structures to relentlessly keep adapting to varying task demands rather than exhibiting fixed patterns of communication regimes.

4.3 Communication Quality and Content

Other than the structural factors, quality and content of communication also play a significant role in team performance. Three qualities of communication that Marlow et al. (2017) identified as predictors of team performance are as follows:

1. Clarity: Precision and clearness of the message
2. Completeness: Extent of exchange of information
3. Timeliness: Appropriate time relationship of communication and task needs

Their results indicate that improvement in these variables is consistent with a mean 28Content-wise, Ellwart et al. (2020) found that superior-performing teams with the best mix of task-oriented and relationship-oriented communication performed better than those with strong liking for either field. In particular, superior-performing teams distributed about 70

4.4 Communication Modalities and Media Selection

The proliferation of communication technologies has expanded the modality options available to teams, with research highlighting the critical importance of appropriate media selection. A comprehensive review by Laitinen and Valo (2018) established that communication modality influences information richness, processing effort, synchronicity, and social presence—each affecting different aspects of team functioning. Brown et al. (2019) study found that highly well-educated modality choice based on task demand supported by 23

- More sophisticated work is handled by wealthier media (videoconferencing, face-to-face) that provide room for nonverbal signals and real-time feedback

- Low processing demands lean media (messaging, email) are effective in coordinating standard procedure.
- Paralinguistic and visual cue-enhancing modalities work best to build rapport with each other

In particular, Gilson et al. (2021) concluded that high-performing teams apply a combination of greater than one modality simultaneously compared to a single channel of communication. In doing so, the "communication ecosystem" allows teams to benefit from the specific strengths of each modality without the specific weaknesses of each modality.

4.5 Cross-Cultural Communication in Teams

As more teams are becoming cross-cultural, research has also examined the problems and remedies for effective cross-cultural communication. Meta-analytic studies conducted by Stahl et al. (2016) revealed that cross-cultural teams experience 27% Research by Tenzer and Pudenko (2017) identified three evidence-based practices that strongly improve cross-cultural team communication:

- Metalinguistic communication: Explicit communication about communication habits and styles reduced misunderstanding by 41
- Cultural metacognition: Those groups who engaged in intensive self-monitoring of the impact of culture on communication style attained 38
- Linguistic accommodation: Style of communication accommodation to audience needs improved information transfer accuracy by 33

In addition, Alikaj et al. (2021) found that technology-enabled communication posed additional challenges to cross-cultural teams since asynchronous text-based communication was also most vulnerable to cultural misunderstandings. As per their research, it is advisable that frequent synchronous communication through the support of visuals is a powerful supplement to written communication in multicultural team settings.

4.6 Communication for Team Learning and Knowledge Integration

Research's more and more recognize the role of communication in supporting team learning and situating knowledge processes. Longitudinal research by van der Haar et al. (2017) revealed that systematic reflective communication-reflection discussions that criticise assumptions, procedures, and results-registered 46Van Knippenberg et al. (2019) also isolated communication behaviours adding to knowledge integration in teams:

- Elaboration: Detailed discussion of information and perspectives
- Transformative questioning: Questions that challenge underlying assumptions
- Constructive controversy: Constructive discussion of differences
- Synthesis communication: Deliberate integration of diverse inputs into integrated frameworks

Their findings show that training teams in these specific communication behaviours results in spectacular gains in innovation outcomes and decision quality.

4.7 Leadership Communication in Teams

Leadership communication contributes greatly to team climate, coordination, and performance. Morgeson et al. (2020) research found that effective team leaders allocate about 70-80Empirical findings by Zaccaro et al. (2016) identified four leadership communication functions critical to team performance:

- Sensemaking communication: Constructing events and creating shared understanding
- Direction-setting communication: Establishing expectations and goals
- Enabling communication: Permitting member input and collaboration
- Feedback communication: Providing developmental feedback on performance
- Their research has found that leaders with proficiency across all four competencies build 34

Chapter 5

Conclusion

5.1 Conclusion: Effective Teamwork in Software Development

The breakdown of teamwork dynamics through the lenses of conflict management, leadership, workload management, and communication identifies a group of interconnected principles that together decide team effectiveness in software development settings.

Across all these areas, there are several repeating themes. Firstly, psychological safety is an invisible factor that makes effective conflict, open workload conversation, and knowledge-sharing conversation possible. Teams in which members can openly express issues and opposing views without suffering negative consequences show better performance in all dimensions. Second, flexibility continues to emerge as a key success factor - either by adapting leadership style to situational needs, changing communication patterns throughout project phases, or changing workload according to evolving demands.

The research highlights that high-performing teams successfully manage seemingly opposing forces. They walk the tightrope between effectiveness for the task and relationship development, bearing in mind that technical quality is insufficient to spur long-term performance. Likewise, high-performing teams alternate between specialization (calling upon individual talent) and cross-training (cultivating team toughness), adapting their modus operandi depending on the needs of the project.

Our own experience of developing the QWERTY social media website as a two-person team clearly demonstrated these dynamics. The smaller team size facilitated direct communication and rapid decision-making, but limited diversity of opinion in problem-solving. Our Object-Oriented Analysis and Design process provided us with formal artifacts that helped with shared understanding, namely through class diagrams showing

system relationships. The leadership of the group member changed easily organically according to domain knowledge, and conflict resolution required direct action due to our interdependence.

The workload problems we faced in balancing objective task workload requirements and subjective work intensity judgments are attested to by the team workload literature review. Similarly, our communication modes changed throughout the project life cycle as different modalities were used for different purposes as we evolved from the design to implementation stages. For subsequent software development teams, this study offers a list of practical implications. Teams should have established processes in place to predict toxic conflict, leadership deficiency, workload imbalance, or communication breakdowns. They should intentionally leave room for productivity-task-work and relationship-maintenance interaction. Most importantly, they should maintain regular reflection routines through which they can adjust their teamwork arrangements based on evolving needs and changing contexts.

As software development environments become more complex, distributed, and heterogeneous, the foundation stones of successful collaboration - successful conflict management, adaptive leadership, fair workload distribution, and sophisticated communication practices - will become more critical. Those teams that master these competencies place themselves in a position to deliver higher-quality technical solutions while keeping members healthy and happy, and high performance in the long term. By integrating such evidence-informed collaboration practice with specific domain technical skill, software development teams can work through the intrinsic complexity of collaborative complex work and maximize both project outcome and individual opportunity for development.

Chapter 6

Reflection

6.1 Danyil Tymchuk's

Personal Reflection on QWERTY Social Network Development (*WebDev Project*)

Collaborating on the Web Development project with my teammate was extremely useful and positive experience. When we collaborated in a duo team, I was a leader of our duo team. Therefore, it means that I set goals, organized our collaboration, and helped determine the general direction of our project. Frequent communication through meeting, texting, and Trello allowed us to have a systematical organization of process and a sustainable progress throughout the whole project period.

Our goal was to create a basic social media application using PHP and a MySQL database. We successfully implemented major features such as user registration and login, user following, post creation and posts management, and reaction to posts such as comments. It was an exciting and challenging project that required close coordination and careful technical planning.

The most challenging aspect for me could be coordinating the various parts of the system concurrently. Building the backend to handle complex relationships among users, posts, and reactions required mutual coordination between us. Since I was leading, it was required for me to ensure that both of us got a clear understanding of the technical tasks and that we divided the workload evenly. I learned that leadership is not just delegating but also standing by your partner, solving problems together, and staying motivated.

I am particularly proud of how well we managed our time and resources. With the use of Trello and regular updates through Discord, we were able to successfully avoid

big miscommunications and let each other know where we stood. We didn't experience significant disagreements or conflicts; when small issues occurred, we were always able to resolve them amicably and respectfully, always working towards the best resolution for the project. This created the team experience very positive and enjoyable.

Working in a team simplified the project in many ways. Having a partner to work with, debug problems, and review code made both of us produce a higher quality result than if either of us was working alone. It also made the project more fun, as we could have little victories to share and push each other to meet deadlines.

I developed both hard and soft skills with this project. From a technical perspective, I improved my expertise in PHP coding, database designing using MySQL, and backend logic management for a web application. I also grasped user authentication, session handling, and generating user interactions in a social network system better. In terms of soft skills, I improved my leadership, communication, and collaboration skills. I also came to understand the importance of listening attentively, delegating properly, and having a positive and team-oriented working culture.

If I were to replicate a similar project, I could spend a little more time in the initial stage on project planning and database designing so that we don't need to make some minor structural changes in the process. Otherwise, I am immensely proud of what we did achieve and grateful for the experience. It showed me that with proper communication, proper leadership, and a collaborative approach, even a small team of people can accomplish great things.

6.2 Artem Surzhenko's

Personal Reflection on QWERTY Social Media Development

6.2.1 Description (What happened?)

During this semester, I collaborated on a two-person team to create "QWERTY," an online social media platform where users have the ability to post status updates, follow others, and comment. We applied the concepts of Object-Oriented Analysis and Design, creating class diagrams and ERDs to represent our PHP, MySQL, and HTML/CSS development. Our GitHub repository tracked our progress as we implemented core functionalities like user registration, posting, following system, and admin panel. The small team size meant each of us worked on various aspects of development at the same time, from design to implementation.

6.2.2 Feelings (What were you thinking and feeling?)

Collaboration in a two-member team developed conflicting priorities. I was excited about greater creativity freedom and sound decision-making initially. This was counter-balanced with worry about the distribution of work.

We only had two of us to complete the entire project. When designing, I was satisfied with ourselves when we got along and performed well together in executing our diagrams but frustrated with conflict because conflict among a small group of people impacted progress greatly. Stress from attempting many things simultaneously always felt excessive, particularly from doing front-end design at the same time as database implementation.

6.2.3 Evaluation (What was good and bad about the experience?)

Our small team excelled with direct communication and agile decision-making. GitHub effectively facilitated our collaboration, while our comprehensive documentation maintained alignment despite working on different components. However, challenges emerged from our limited size - workload sometimes became imbalanced, with fewer resources to draw upon when obstacles arose. Our two-person perspective limited the diversity of input during problem-solving. While we successfully implemented all core features, aspects like UI refinement received less attention than they might have in a larger team.

6.2.4 Analysis (What else can you make of the situation?)

Our trial demonstrated basic principles of team workload studies. As a two-member team, the difference between objective workload (our task list) and subjective workload (perceived workload) was especially influential on our productivity. Our face-to-face communication was demonstrated to have decentralized network benefits without the diversity that produces innovation. OOAD methodology provided us with robust coordinating mechanisms through formalized artifacts like our class diagrams showing User, Post, Comment, and Follower relationships, which afforded us landmarks that reduced ambiguity.

6.2.5 Conclusion (What else could you have done?)

In hindsight, we could have had organized workload monitoring to balance earlier and utilize GitHub project management more effectively. Pair programming on a regular

basis would have provided improved knowledge transfer and avoided "single point of failure" problems. Having coding standards firmly in place early on would have reduced integration problems. Looking around the corner could have revealed design problems of which we were unaware due to our limited view.

6.2.6 Action Plan (If it arose again, what would you do?)

For future small-team tasks, I would:

1. Consciously have knowledge-sharing meetings in areas of specialization identification
2. Utilize formal workload control and weekly capacity checks
3. Employ a "minimum viable feature" habit for each development iteration
4. Plan frequent external reviews in order to view things from outside of our own team's perspective
5. Have technical documentation superior to design diagrams
6. Employ light-weight collaboration tools specifically designed for small teams

These would utilize small team strengths as well as mitigate challenges we face in creating the QWERTY platform.

Chapter 7

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