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COVID-19 AND THE CHOICE OF ONLINE FACILITIES

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Abstract:
Many universities were facing a massive challenge regarding the question of what online facility worked best to deal with the challenges the COVID-19 pandemic caused. How can we support the overnight changed requirements? Is there a more advanced tool for group communication and online-teaching? The developments in the latter market moved very quickly. New players arose (Zoom, Google meet, Microsoft Teams, etc.), and old players (WebEx, Skype for Business, etc.) updated their facilities to be better able to meet the requirements of online-education. Many universities went through a substantial discourse to determine what environment should be best and which environments/solutions have characteristics that could prohibit their use completely (for instance privacy issues). Fact is that different universities made different choices. The general answer which environment is best is not available. Based on our experience regarding the selection of an e-learning environment, we will explore what criteria may be used and whether organisational structures, as well as learning theoretical principles, are essential considerations when making a decision. For the sake of simplicity, we will look at the most discussed dilemma in the Netherlands: choosing between Zoom and Teams.

Keywords: Covid-19, IT-support, Adaptability, Requirement analysis, Multi-platform, Learning theories

I. INTRODUCTION
The Covid-19 crisis led to an unprecedented rapid move towards online teaching. Social distancing, lock-downs, the use of mouth caps, closed border crossings, all unforeseen developments for which no predefined countermeasures were known. Digital collaboration and conference tools had to be chosen because even in today’s social media world nobody was prepared.

Many universities chose an approach in which requirements-based solutions for the primary process of education were sought under high pressure. Should we opt for traditional tools such as WebEx, should we rely on large vendors such as Microsoft with its developing Teams-environment or should we opt for a new player on the market such as Zoom, which does not suffer from the law of inhibiting lead.

The discussions were fierce. In the Netherlands, several universities choose Zoom, the majority choose Teams, and a few consciously opted for a multi-platform strategy in which Zoom is used for education and Teams for research and collaboration.

It became clear that a one-size-fits-all approach leads to a sub-optimal outcome. In this discussion paper, we will discuss some considerations.

II. CRITERIA FOR COLLABORATION AND CONFERENCING SYSTEMS
When we do a standard analysis for a new software environment for conferencing and collaboration, it is common to formulate several requirements. Without suggesting being complete, these can be categorised in:

- Functional requirements
  Requirements are then formulated concerning knowledge sharing numbers of people who can work together at the same time in a collaborative environment, the possibilities regarding breakout rooms, etc.
- **Non-functional requirements**
  We can think of user-friendliness, speed, intuitive interface but also factors such as security and privacy.

- **Price**
  Affordability and maintainability at a reasonable cost, also play an important role.

How does it work out in practice? Three considerations:

1. None of the systems meets all requirements. There is simply no such thing as the ‘optimal one’.

2. It’s a dynamic market, and products are changing under high time-pressure. For example, Zoom was known to be insecure – therefore, many companies forbid Zoom to be used on their internal networks - but recently, Zoom has added end-to-end encryption. This solution might prove to be better than the one in Teams.

3. As we are facing completely new circumstances, there is not yet a clear insight into the requirements. They constantly change. And when we relate this with the changing functionality offered by the different systems, the outcome is a dynamically changing battlefield where traditional system development approaches do not meet the challenge we are facing.

To summarise: the ‘normal’ approach is to choose for an extended period. But, each choice is a compromise - to a certain extent. In such a dynamic context, the choice today might not fit in a month or even a week from now. Given this specific case and the dynamics of the market, we must admit that it’s a somewhat random choice, depicted by chance. In that sense, the process of choosing is different compared to, for example, the choice of an ERP system where the dynamics are not that high.

Other considerations should, therefore, play a more contextual role in the selection process. But first, we briefly look at the developments that online environments are going through.

### III. CHARACTERISTIC OF ONLINE ENVIRONMENTS

Within the brief scope of this discussion paper, it is impossible to do a complete analysis of all systems on the market. We will, therefore, limit ourselves to a brief consideration of Zoom versus Teams.

- **Teams**
  Teams is a collaborative platform for internal communication and therefore, suitable for facilitating communication between staff and students. It integrates seamlessly with other Microsoft products because it is part of Office 365 subscriptions. There are facilities for file sharing, chatting and collaborating on documents, all facilities made possible by the integration with Office 365. External participants can also participate in video conferencing, but the user experience can be improved.

- **Zoom**
  Zoom is mainly a conferencing application where the video facilities are a strong point. Two factors can be mentioned for the growth of Zoom: 1) the quality of the video facility is high, and 2) the user-friendliness is exceptionally high both within the organisation and in communication with the environment. Hardly any technical knowledge is needed. A weak point is (or now - was) the security and the way personal data is handled.

The ambition and the accompanying roadmap of the two environments are different, but both systems are being developed at a truly furious pace. Both environments learn from each other and are trying to outdo each other. As a result, they are growing strongly towards each other. Given these highly dynamic developments, a static approach via a requirement analysis isn’t satisfactory.
We suggest an analysis via a learning theory approach or via a fit with the current organisational structure.

IV. THE IMPACT OF LEARNING THEORY ON THE CHOICE FOR ONLINE FACILITIES

The literature on learning theories name several different approaches. The best-known are behaviourism, cognitivism and (social) constructivism. Connectivism is newly proposed, based on changes in society and new insights into the impact of ICT/internet on learning. Below we give a brief description of these approaches (Abcouwer & Smit, 2007, 2009):

- **In behaviourism**, learning takes place in a repeated process of action and feedback. The best results are achieved by positive affirmation of behaviour. Skinner’s (1958, 1972) view on learning has been highly influential in the field of education. In his opinion, learning is the observable change in behaviour. In education, the main characteristics of behaviourism are the focus on positive and negative affirmation of behaviour, as well as a constant need for tests and feedback. In this approach, the distinction between student and teacher is clear. The teacher knows, the student doesn’t.

- **In cognitivism**, learning has been established as a response to behaviourism. Apart from the observable behaviour that behaviourists believe in, internal processes are also important (Valcke, 2000). Therefore, this approach is focused on: knowing, obtaining knowledge, internal mental structures. Guidelines for cognitive learning are among others: hierarchical analyses, knowledge building based on other knowledge, structuring, organising and sharing knowledge and creating a learning environment that enables and encourages students to make connections to existing knowledge. Similar to behaviourism in this approach, the distinction between student and teacher is also evident. The teacher knows, the student doesn’t.

- **Constructivism** states that people put a meaning on experiences in their own way (Bartlett, Burton, & Peim, 2001; Cole & Cole, 2001). The approach starts from the idea that a person absorbs certain experiences into his already existing knowledge (assimilation and accommodation). Lev Vygotsky and Jerome Bruner added the social component to constructivism. They assumed that communication represents a substantial added value in the learning process (Bartlett et al., 2001).

  Learning within social constructivism consists of creating and arranging concepts in the brain. Therefore, it is not learning fragmented knowledge by heart but the development of meaningful concepts based on experiences and a realistic context (Cox, 2005; Kolb, 1984; Kral, 2005). In this approach, learning is made into a social activity, which is carried out together with others. Through collaborating and communicating, the student is obliged to clarify his thoughts, and he is confronted with the weaknesses of his ideas (Van Lehn et al., 1993). A more recent implementation of the ideas of social constructivism can be found in the Natural Learning approach, as founded by van Emst (2002). In this approach, every participant plays different roles, sometimes as the supplier of knowledge and skills sometimes as a consumer.

- **Connectivism**, as new learning approach, is proposed to explain the impact of new technology on learning. Learning has always been considered a process inside an individual. However, according to connectivism, learning is a process that may occur outside the individual, within an organisation or database. Connectivism is based on theories on chaos, network, complexity and self-organisation. The connections by which we can learn are more important than what we currently know, i.e. “the pipe is more important than the content of the pipe” (Siemens, 2005). The combination of ideas created by weak links can develop innovations and insights. Connectivism starts from the individual, whose knowledge is comprised of a network. The individual feeds this into
organisations and institutions, which in turn feedback into the network, giving the individual the possibility to continue learning. This cycle is instrumental in successful learning.

The requirements for using information and communication technology differs for each of these approaches. Crucial aspects are: do we need knowledge-sharing facilities or should the focus be mainly on facilitating communication in a highly user-friendly way. The first two learning theories have a higher need for knowledge and skills management organised by the teachers, in the latter two, communication is more important, knowledge sharing of all people involved is already organised on an individual level.

In the requirement analysis by our institution, it was found that there was a clear need for additional tools next to our LMS (we use Canvas) to support live interactions. Where Teams better supports knowledge-sharing, while Zoom is more communication and conferencing oriented. So, the division seems quite clear but needs to be further elaborated. Teams is a better fit for behaviourism and cognitivism while Zoom might fit better in constructivism or connectivism. At our institution, it was obvious that teachers choose Zoom over Teams for education while the organisation preferred to use Teams for collaboration. Whether an organisation can afford this, since using two systems leads to high maintenance costs, will have to be determined by the institution.

Universities, however, do not utilise a single learning approach. What to choose then? Or is it best not to choose? Might a multi-platform approach be a way out? This section first describes the various components of individual references and then shows the order in which these components are put together.

V. CHARACTERISTICS OF THE UNIVERSITY ORGANISATION

When looking at a university setting, the organisation structure is essential when looking at the education, research and valorisation. We need to strike a balance between academic freedom and the bureaucratic organisation. Based on previous research, there are three primary types of organisations. The rational organisation mainly based on hierarchy and control. The second type is the integrative form based on cooperation, and the third one is the libertarian style with the main focus on autonomy. The complexity of the university setting requires that a combination of control, cooperation and autonomy be facilitated. See below a summary based on Keidel (1995), de Geus (1989) and Abcouwer, Takács, and Banga (2020).

Control-based rational organisation

A control-based organisation should focus on the question of how to reach unity in the organisation. Therefore, it is necessary to introduce a power base at the top of the organisation. The difference between leaders and who are led is rigorous. There is a functional division of roles.

Individuals do not have the power to accept discernment and autonomy as free participants in the organisation. The basic concept is discipline. People are supposed to be obedient. In fact, an organisation is nothing more than power over people and resources. This quite extremely formulated view on the rational organisation is based on the requirement for accountability. Also, the requirements from accreditation enforce universities to implement rather strict standards. The main issues in the organisation are efficiency and rationality. Issues like harmony and conformity are less critical to the organisation.

Cooperation-based integrative organisation
An organisation should strive for variety, not for unity. The switching of those managing and those being led makes it impossible to identify leaders and followers. Cooperation is the leading principle here. Members of the organisation can make decisions for themselves. But they do that taking into consideration the setting they are part of. The organisation is not based on blind discipline. It means restraining oneself to the will of the majority. Members can contribute to finding the way of the organisation on where to go. The organisation aims for both the needs of the individual as well as on efficiency and rationality. It is a vital necessity for the success of the organisation. In a university setting, it means that groups work together, they stimulate and inspire each other. However, in the end, the focus is still on the organisation, and the role universities play in society. Valorisation and this knowledge sharing are crucial in this setting.

**Autonomy-based libertarian system**

An underlying assumption within a university setting is that individual faculty has the disposal of all the qualities that think and work in full freedom. They are hired to be smart and intelligent and work on developing the unknown. This type of organisation breaks with the traditional view of order and discipline. Individuals lead themselves. Self-organisation is the leading principle; individuals are perfectly able to decide in what direction research should take place. This approach forms the base for fundamental scientific research as being opposed to applied scientific research (mainly based on a cooperation setting)

The descriptions of characteristics of the three types of organisations mentioned above are indicative of the differences in the approach to organisations. It can be asked which of the three approaches best fits one’s organisation. In education, these differences are essential. When the education is mainly based on realising knowledge transfer from teacher-to-student, a control approach will fit. When the objectives are based on stimulating the creativity of students to become an independent thinker, control will not work. Autonomous thinking and co-creation required autonomy and cooperation and an organisation structure using the cooperation and autonomy paradigm.

By identifying the differences, one may recognise which one is most relevant in actual practice.

Translating these views on organisations, we may conclude that Teams in practice fits better in a control - and partly a cooperation approach. There are more substantial issues around control and steering from the top. Zoom better facilitates the autonomy-based approaches and partly cooperation as being focused on freedom and communication.

When we look in this perspective to the three main tasks of a university, we may conclude that education primarily when organised under the judgement of accreditation has strong elements of control (where Teams probably fits better). A focus on cooperative learning might be better suited to Zoom.

The intermediate conclusion is that there is no one-size-fits-all solution. A Multi-platform approach could be the way ahead. It gives the freedom to choose the best tool, depending on the actual needs. But inevitably, this will lead to higher implementation and maintenance costs. Further elaboration is necessary.

**V. SOME CONCLUDING REMARKS**

Looking at the consideration for choosing, as introduced in this discussion paper, it is clear that choosing for collaboration and conferencing systems is not a trivial choice. We want to conclude with some finalising remarks:

- Traditional requirements analysis at best leads to semi-optimal solutions. It helps in filtering the non-compliant solutions, resulting in that the remaining systems are more or less satisfactory, but not entirely.
• Organisations have two easily distinguishable options: (1) Choosing for a single solution based on the distinct learning-theoretical approach and how the organisation is organised or (2) opt for a multi-platform approach. In both cases, we must look at how the specific shortcomings are dealt with. One criterium will be the cost aspect of the choice made.

• The world is changing continuously; the law of the inhibiting lead is being negated on both sides. Both Zoom and Teams learn from each other and improve extremely fast. So, the real challenge is not choosing, but making a resilient choice.

So, in conclusion, enough food for thought!!!

VI. REFERENCES


