

The fastest way to influence and teach a specific age group how to read and understand process models; PhD proposal

Iris Mulder¹

¹No Company, Leusden, the Netherlands

Abstract

This paper is my PhD proposal in which I discuss and scope the problem, discuss a research question and propose a solution based on literature to start understanding the problem.

Keywords

DEMO, enterprise engineering, visualisation, visual literacy, process model, interaction, social psychology, psychology,

1. Introduction

In this research proposal, I will discuss the relevance of my research proposal and why it is worth a full doctoral position.

2. Problem definition

Within the process modelling community and especially the EE / DEMO community, there is a knowledge gap in how we get people to read process models accurately and, more specifically, how to teach them to accurately read process models in the least amount of time. A more in depth review of this knowledge gap is described in the section **literature**. The people we want to get to read and understand process models are not trained to work, make or read process models on a daily basis, but nonetheless can encounter process models in their line of work. This can happen for different reasons, i.e. they encounter it in an assignment; they work with someone who uses them; a customer presents with a process model. There can be different reasons for encountering them, nonetheless, in all instances it is preferable if they understand what is shown. Because of the irregular interval in which they encounter process models, they do not have the motivation to study process models in depth (more of a guess, search literature). Nonetheless, the process models they encounter holds valuable information for their business and it is important for their business that they understand what is communicated within the process model. Time constraints are a regular occurrences in businesses, therefore it is in the best interest for the maker of the


CIAO! Doctoral Consortium, EEWFC Forum 2022, November 02-04, 2022, Leusden, NL

✉ iris23mulder@gmail.com (I. Mulder)

🆔 0000-0002-0386-4838 (I. Mulder)



© 2022 Copyright for this paper by its authors. Use permitted under Creative Commons License Attribution 4.0 International (CC BY 4.0).

 CEUR Workshop Proceedings (CEUR-WS.org)

process model and for the person reading the process models that a process model is quick and accurately to read.

3. Problem scoping

The advantage of reading a process model accurately is that the right information can be found. To get people to read process models accurately, we will focus on improving people's skills (visual literacy) to read process models. Visual literacy is potentially related to the reading of process models; therefore, this is a suitable measurement. There are different alternative to visual literacy However, we choose visual literacy based on different researches where visual literacy has proven important within process models or most suitable in visualisations. In addition, we want to look at the difference in speed of learning and the difference in abstraction levels people have when reading process models in relation to their visual literacy. The saying goes, time is money, therefore, the faster we can accurately teach people to read process models, the more money is made. Process models are an abstract visualisation and can therefore be measured with visual literacy. By researching this in two different age groups, i.e. 12 to 14 years and 25 to 65 years, we can help current, and future generations improve. We have chosen these age groups for a few reasons. The age group 25 to 65 years old is the working population. This is the group that will encounter process models the most compared to the other ages. Within this group a differentiation could be made between junior, medior or senior employees, should there be a significant difference between them. The group 12 to 14 years old is specifically selected because of a new subject being taught in some school in the Netherlands. This subject is, for now, only being taught to 12 to 14 years old, but has an initiative to broaden to older children as well. The subject is called 'digitale geletterdheid', digital literacy, and teaches the children different aspects of the digital world and how to use it. For now there is no set curriculum yet. We think this is a good opportunity to start teaching how to read process models to young children and hopefully get this added to the curriculum within digital literacy should this prove to be effective. This way we hope to do justice to the following Dutch saying: learned young, done old.

4. Research question

What is the fastest method to influence and teach a specific group how to read process models?

The first thing we need to look at is the time. What is fast? In this research we will be working with the process models of DEMO. A course to learn the base of DEMO is three days Therefore, to be fast than a full course, we need to at least define fast as maximum a day in this instance. Preferably even half a day? However, we also have to find out in this research if that is possible, and if it is not, than what is? Define a method. In the end we have to measure if what we taught will be effective. We will either have to find a measure suitable for this, or create a measure suitable based on what we want them to be able to do. We can also think about long-term. If we test them again in one month, six months, or a year, will they still be able to read the process models?

5. Solution proposal

To answer our research question, we want to do a three-part study to find an answer. First, to figure out what is the fastest way to learn to read process models, we have to study how people read process models. With the help of eye-tracking software, we can study where people's focus and attention first go to in process models and other kinds of visuals. With this information, we can discern the focus and attention points of people. Consequently, this will help us decide what visual aid or method of teaching might be of the most influence to help people to read process models.

Second, the people themselves are a factor in understanding process models. However, people do not always know what truly helps them. Therefore, what people think helps them read process models and what actually helps them might differ. However, this might prove a valuable insight into how people think they perceive visual information from process models. By conducting interviews with people at different employment levels, we can learn what people think they need and how this might differ depending on their position.

Third and last, based on the information collected from parts one and two, we can start to form an education program in which we will influence and teach people to improve their skills to read process models accurately. This improvement can be set up in different formats, e.g. lessons, legends, and additional textual support. By testing these different formats, we can discern the fastest and best method to influence and teach a specific group to read process models.

This way, we can help the modelling community get their message across and support the commercial community to run their business effectively.

6. Literature

To our knowledge, there is no answer in the current literature as to what method works the fastest to influence and teach a specific group how to read process models.

We have found literature that is interesting but needs further analysis.

- Research into more straightforward and transparent approaches, but without formal evaluation [1].
- Visualisations are not good for C-level [2].
- Conceptual modelling needs understanding of the concepts [3].
- Visualising data with insights from cognitive psychology and visualisation science [4].

Organisations use information systems to improve effectiveness and efficiency [5]. However, the achievement of this effectiveness and efficiency depends on the capabilities of the information system and the characteristics of the organisation [5]. It is the responsibility of the researchers in the information systems discipline to “further knowledge that aids in the productive application of information technology to human organisations and their management” [5]. Hevner et al. argue that such knowledge involves complementary but distinct paradigms, behavioural science and design science. Not only Hevner et al. have researched the design science approach, also other

researchers have delved into this subject []. Therefore, in this PhD we will focus on behavioural science within information systems and process models.

Hevner et al. argue that the behavioural science paradigm seeks to find “what is true”, in contrast to the design science paradigm, who seek to create “what is effective”. Although, in essence, we agree with the statement, we believe this statement is too simplified, since behavioural science and design science often go hand in hand and are sometimes inseparable.

Behavioural science can have the danger of overemphasising on contextual theories [5]. By combining behavioural science with computer science, thus executing interdisciplinary research, we hope to minimise the overemphasising of contextual theories.

There is a strong need to improve the way to present and communicate DEMO models [1].

Information systems research lies at the interaction of people, organisation and technology [6].

There is a need found to represent information in a more straightforward and orderly way [1]. In their research, Pinto et al. have created an approach that presents the information more straightforwardly and transparently, easier to understand by everyone involved. However, there is still complexity present. Some words were “strange” terms for people non-familiar with DEMO and relate more to common terms that they already knew [1].

7. Outcomes and contributions

With this PhD I hope to contribute to the Enterprise Engineering (EE) community and shed some light on the human (psychological) side of programming. Programming is on the data-side of the work, but when this is finished it arrives at the human-side of work. Through literature I have conjectured that the human-side still has some ‘problems’ that I hope to help solve some of them with this research.

8. Proposal state

I recently finished my master’s and intend to create this proposal and submit it as a doctoral paper to the Enterprise Engineering Doctoral Consortium (EEDC) for feedback. The idea has been discussed with a few professors active in modelling.

9. Past work

In June of 2022, I finished my Social, Health and Organisational Psychology (SHOP) master’s at Utrecht University.

10. Future plans

Having just finished my master’s, I want to get a full doctoral position to research the thesis described above. We will have submitted this proposal paper at EEDC on September, 5th 2022, for discussion on November, 2nd 2022.

References

- [1] D. Pinto, D. Aveiro, D. Pacheco, B. Gouveia, D. Gouveia, Validation of demo's conciseness quality and proposal of improvements to the process model, in: *Advances in Enterprise Engineering XIV - 10th Enterprise Engineering Working Conference, EEWC 2020, Revised Selected Papers*, volume 411, Springer, 2020, pp. 133–152. doi:10.1007/978-3-030-74196-9{_}8.
- [2] M. A. T. Mulder, A design evaluation of an extension to the demo methodology, in: *Advances in Enterprise Engineering X, Advances in Enterprise Engineering XIII*, Springer, 2019, pp. 55–65. doi:10.1007/978-3-030-37933-9{_}4.
- [3] H. C. Mayr, B. Thalheim, The triptych of conceptual modeling, *Software and Systems Modeling* 20 (2021) 7–24. doi:<https://doi.org/10.1007/s10270-020-00836-z>.
- [4] S. S. Alhadad, Visualizing data to support judgement, inference, and decision making in learning analytics: Insights from cognitive psychology and visualization science, *Journal of Learning Analytics* 5 (2018) 60–85. doi:<https://doi.org/10.18608/jla.2018.52.5>.
- [5] A. R. Hevner, S. T. March, J. Park, S. Ram, Design science in information systems research, *MIS Quarterly* 28 (2004) 75–105. URL: <http://www.jstor.org/stable/25148625>.
- [6] M. S. Silver, M. L. Markus, C. M. Beath, The information technology interaction model: A foundation for the mba core course, *MIS Quarterly* 19 (1995) 361–390. URL: <http://www.jstor.org/stable/249600>.