Card-Based Activity to Raise People's Awareness about how the Digital World Works

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Abstract. Digital technologies are omnipresent in our daily lives. Since people have to interact with them, it is crucial that they understand how the digital world works. This contribution proposes an activity based on cards to raise people's awareness on computer science concepts. During a 60 to 90 minutes workshop, participants working in groups of 2 to 4 people have the opportunity to analyse a real-world situation involving an interaction with a computer system. The cards and a board both structure their analysis and guide them through their thinking. The activity has been tested once and improvements are planned as future work.

Keywords: Informatics · Digital world concepts · Card game.

1 Introduction

Digital technologies are spreading, reaching mostly every aspects of our daily lives and this will be even more true in the future. To be able to interact genuinely with them, humans need to understand a bit how they are working. This contribution proposes a card-based activity that can be conducted in a short time to make their participants aware of what is the digital world. The activity makes the participants think, starting from a real-world situation they have to analyse regarding the components the analysed computer system is made of.

1.1 Related work

Using games to teach computer science concepts is a very common approach that has been used in many projects [7, 3, 4]. In particular, card-based games or activities are being developed, should it be for pupils and targeted to broad concepts [5] or for older students and on more specific subjects [6, 1].

1.2 Motivation

Designing an activity based on cards and that can be used with a limited amount of time makes it suitable for many kinds of events. Also, having a pen-and-paper unplugged activity makes it more engaging and motivating [2]. The proposed activity can also be easily adapted to different age groups and learning goals, simply by selecting the cards to use or by designing new cards.

2 Card Game Design

The proposed activity to raise awareness among people about how the digital world works is based on cards. These latter are organised in different categories depending on their role in the activity. The proposed activity lasts between 60 and 90 minutes and can be organised in groups of 2 to 4 people.

2.1 Cards

The spirit of the proposed activity being to be connected to the real world, the first category of cards is the "situation cards". These cards describe a situation in which there is an interaction with a computer system. As shown on Figure 1 (left card), these cards have a title, a picture and a description text. During the activity, participants have to use cards from other categories to analyse the situation they chose to work on. Figure 1 shows one "hardware card" and one "software card" (on the right). These two categories are at the heart of the proposed activity as any computer system always consists of at least one hardware and one software element. Participants will have to identify which hardware and software components may be involved in the computer system they are analysing, starting from the situation they are working on. Other categories of cards have been defined, like "input cards" and "output cards".

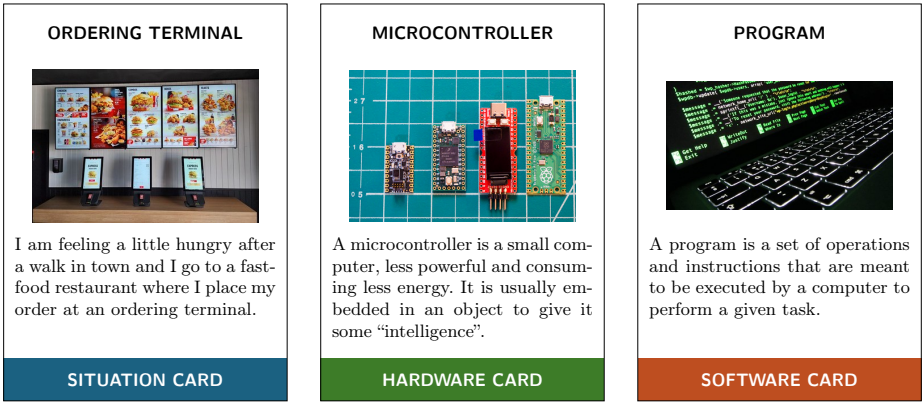

Fig. 1. Situation cards are the starting point of the activity, proposing a real-world situation to be analysed. Hardware and software cards are use to make participants aware of invisible parts of computer systems.

2.2 Activity board

To organise the activity, each group of participants receives a sheet of paper which is the activity board, used to guide the activity. Figure 2 shows the board

which consists of four areas. When analysing the real-world situation in the activity, the participants first have to go through all the hardware and software cards, identifying those which they think are involved in the computer system under analysis. The group then writes for which purpose each chosen hardware and software component is used in the computer system. They then think about the input provided to the system and the output that it produces, to refine their analysis. Each group then presents the results of their work in front of everyone, to get a direct feedback from the other groups and from the animator.

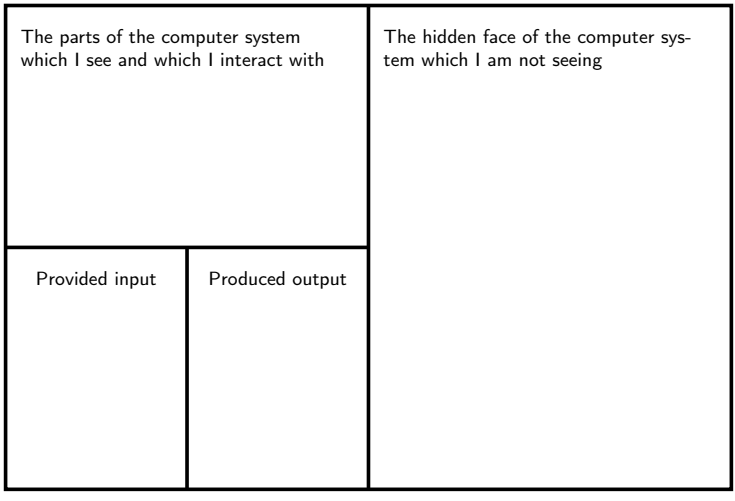

Fig. 2. The activity board consists of four areas that are guiding the analysis produced by the participants based on the cards.

3 Conclusion and Future Work

To conclude, this contribution presents an activity based on cards that can be used to help raise people's awareness about how the digital world works. The proposed activity has been tested with three groups of adults who never got any courses related to computer science in their education. The feedback collected right after the workshop was positive as the participants felt that they learned things they were not aware of. The activity also sparked the curiosity of the participants to know more about informatics. Future work includes adding new cards in each category and also attach a level on each card, to ease the design of several activities adapting to different audiences.

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References

1. Baker, A., Navarro, E.O., van der Hoe, A.: An experimental card game for teaching software engineering processes. Journal of Systems and Software **75**, 3–16 (2005)
2. Bell, T., Alexander, J., Freeman, I., Grimley, M.: Computer science unplugged: School students doing real computing without computers. The New Zealand Journal of Applied Computing and Information Technology **13**(1), 20–29 (2009)
3. Combéfis, S., Beresnevičius, G., Dagienė, V.: Learning programming through games and contests: Overview, characterisation and discussion. Olympiads in Informatics **10**, 39–60 (2016)
4. Combéfis, S., Stupurienė, G.: Bebras based activities for computer science education: Review and perspectives. In: Proceedings of the 13th International Conference on Informatics in Schools: Situation, Evolution, and Perspectives (ISSEP 2020). pp. 15–29 (2020)
5. Dagienė, V., Futschek, G., Koivisto, J., Stupurienė, G.: The card game of bebras-like tasks for introducing informatics concepts. In: ISSEP 2017 Online Proceedings (2017)
6. Denning, T., Lerner, A., Shostack, A., Kohno, T.: Control-alt-hack: the design and evaluation of a card game for computer security awareness and education. In: Proceedings of the 2013 ACM SIGSAC conference on Computer & Communications Security. pp. 915–928 (2013)
7. Videnovik, M., Vold, T., Kiønig, L., Bogdanova, A.M., Trajkovik, V.: Game-based learning in computer science education: a scoping literature review. International Journal of STEM Education pp. 10–54 (2023)