The digital office simulation LUCA from the perspective of teachers and learners

First findings of usability analyses

Sophia Gentner, Sabrina Ludwig, Anke Braunstein, Christian Mayer, Viola Deutscher, Andreas Rausch & Jürgen Seifried

Introduction

Digitisation of business processes:

➢ Less emphasis on routine activities, shift towards more complex tasks (Frey & Osborne, 2017).

➢ Shift in competences requirements for apprentices in the commercial sector: relevance of problem-solving skills (Rausch et al., 2021).

Digitisation changes learning and instruction within VET:

➢ Diverse options for the design of technology-enhanced instruction.

➢ Potential of simulations for learning (Chernikova et al., 2020).

Introduction

- Simulations simplify real-world situations and provide a wide range of learning opportunities (Plass & Schwartz, 2014).

- In the business domain, office simulations provide a learning environment where learners can experiment, learn by doing, receive feedback, and thus acquire relevant skills for their future office workplace (Caruso, 2019).

Origins of LUCA

- Research and transfer project *Problem-Solving-Analytics in Office Simulations* (Initiative ASCOT+, 2019-2023)

- Development of the **Office Simulation LUCA** for use in VET
  - suitable for school-based part of the apprenticeship   focus of the paper
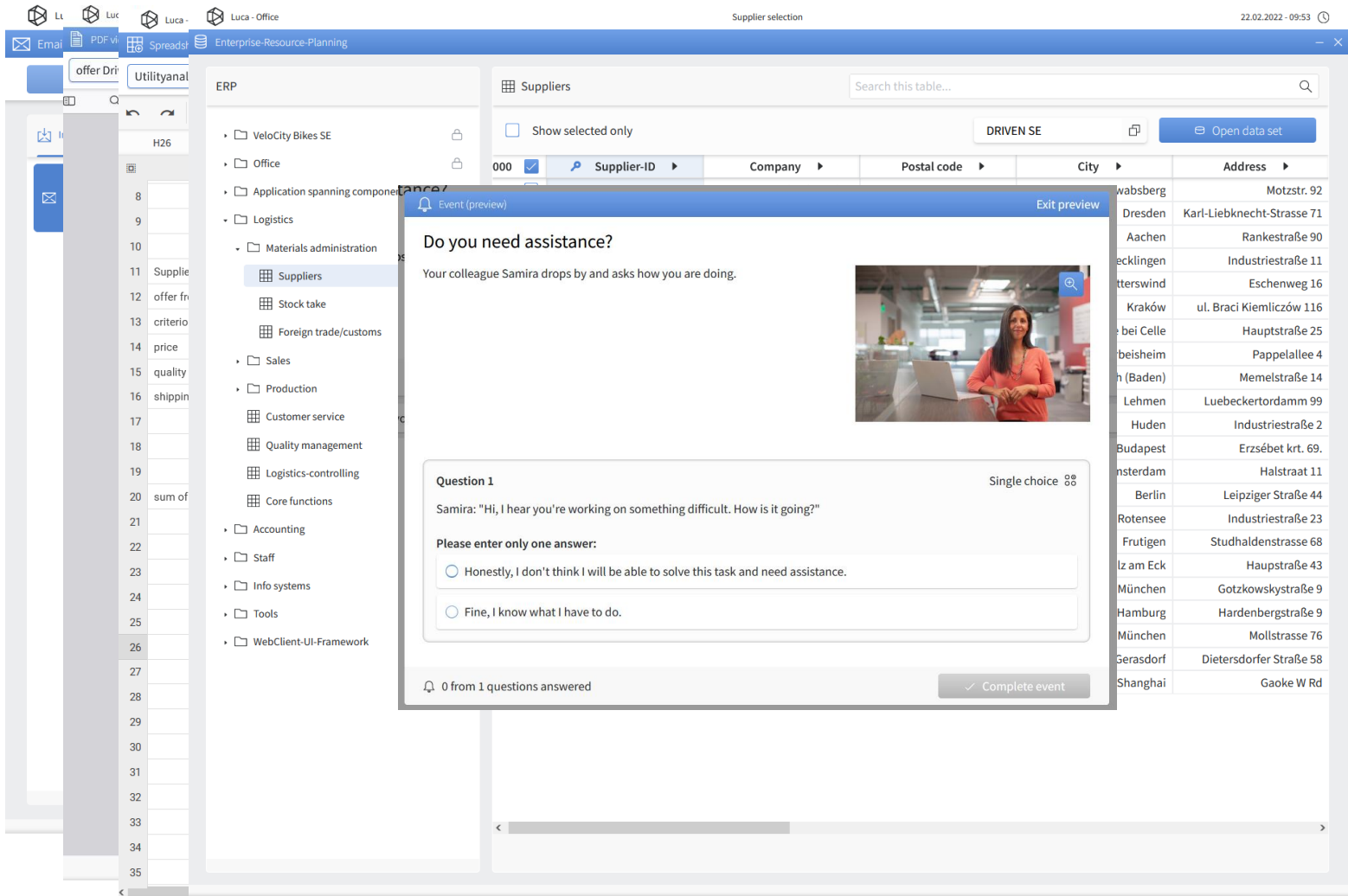 - suitable for in-company training

SPONSORED BY THE

Federal Ministry of Education and Research

Simulation-based teaching and learning with LUCA

- **LUCA** is an online service and is available (in German and English) free of charge as an Open Educational Resource (OER).

- **Learners**
  - use authentic office tools (e-mail client, spreadsheet application, notepad, etc.) to tackle
  - authentic work scenarios (consisting of e-mails, business documents, etc.)
  - in order to acquire relevant skills for their future office workplace.

- **Teachers**
  - can create their own scenarios or adapt existing ones,
  - provide adaptive support,
  - and monitor the learners' work processes in real-time.

Access to the software via https://luca-office.uni-mannheim.de/#/

Glimpse of the office simulation LUCA

Study Design and Method (1/2)

Perception of LUCA by learners and teachers

Instrument

Learners
- Short questionnaire:
    - five items for the user experience with a 7-point Likert scale ("UEQ-S", adapted from Schrepp et al., 2017)
    - one open-ended question to provide additional feedback on LUCA

Teachers
- Semi-structured interview questionnaire
- Interview topics: intention to implement LUCA in the classroom; perceived facilitating and hindering factors for implementation

---

Data collection

Learners
- Data collection at various commercial schools (in Baden-Wurttemberg, Germany).
- First, the learners worked through the supplier selection scenario in LUCA Office. Second, they filled in the questionnaire.

Teachers
- Teachers who participated in a workshop introducing the use of LUCA were asked for an interview afterwards.
- 1-on-1 interviews via Zoom; transcription of the audio files

Study Design and Method (2/2)
Perception of LUCA by learners and teachers

Data analysis	**Learners**

- evaluation of the five closed items
- applying *Qualitative Content Analysis* for the open-ended question

Teachers

- applying *Qualitative Content Analysis*

Sample	**Learners**

- in total 680 commercial apprentices
- Sex: majority being female (64%)
- Age: 21.4 years on average

Teachers

- in total 10 interviewees (teachers from vocational schools)
- Sex: majority being female (n=8)
- Age: 39.6 years on average

Findings
Perception of LUCA by learners

- Items related to the use of the learning environment rated by learners:

Item	Mean	Standard deviation	Min	Max
interesting	5.14	1.44	1	7
understandable	5.09	1.50	1	7
pleasant	5.02	1.44	1	7
easy	4.88	1.53	1	7
clear	4.53	1.71	1	7

Note: 7-point Likert scale (as an example for item "interesting": 7 = very interesting, 6 = interesting, 5 = somewhat interesting, 4 = neutral, 3 = somewhat not interesting, 2 = uninteresting and 1 = uninteresting; this scheme applies analogously to the other four items)

- Open-ended question: general feedback (208 codings) and suggestions for improvement (280 codings)

Findings

Perception of LUCA by learners

General feedback (208 codings)

Negative feedback (5)

Moderate feedback (11)

Positive feedback (192)
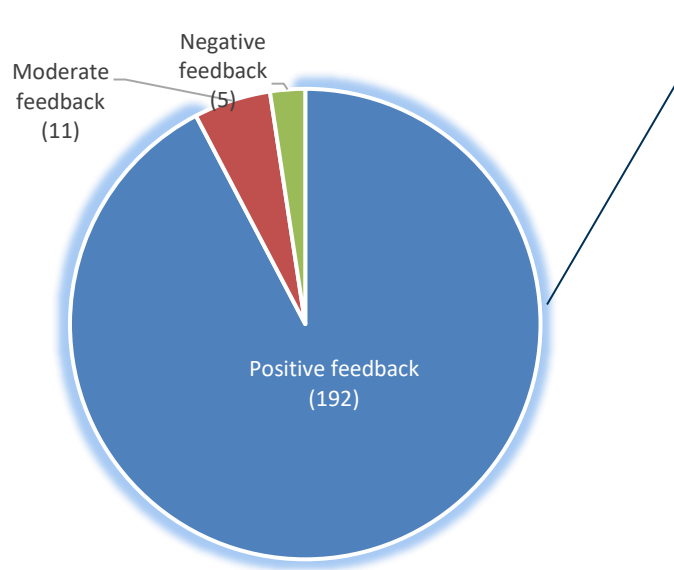
A total of 12 topics can be distinguished for positive feedback, e.g.:

- **Clear design** (23)
  "Very clear and user-friendly, making it easy to work with."
- **Interesting** (20)
  "A very interesting simulation, highly recommended."
- **Authenticity** (15)
  "Good idea to gain insight into potential processes within a company."

Findings
Perception of LUCA by learners

Suggestions for improvement (280 codings)
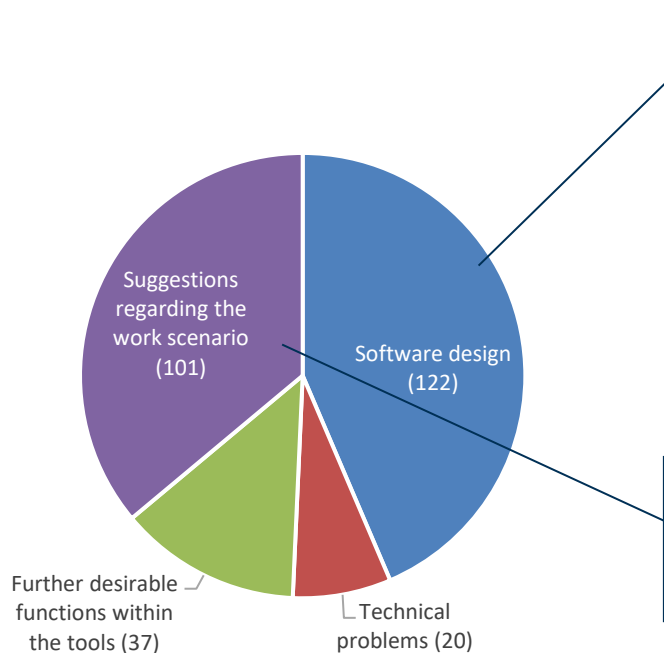
In terms of software design, especially incorporating a **split screen** feature (92) and enhancing the **clarity of the design** (20) are stated.

- "One should be able to open multiple documents at the same time."

Regarding to the work scenario, e.g. the **time constraint** (37) and the **difficulty level** (27) were mentioned.

Pie chart labels:
- Software design (122)
- Suggestions regarding the work scenario (101)
- Further desirable functions within the tools (37)
- Technical problems (20)

Findings

Perception of LUCA by teachers

Perceived facilitating factors for the implementation (120 statements)

Characteristics of teaching staff (14)

Characteristics of the school (18)

Environment and implementation support strategies (19)

Characteristics of LUCA (69)
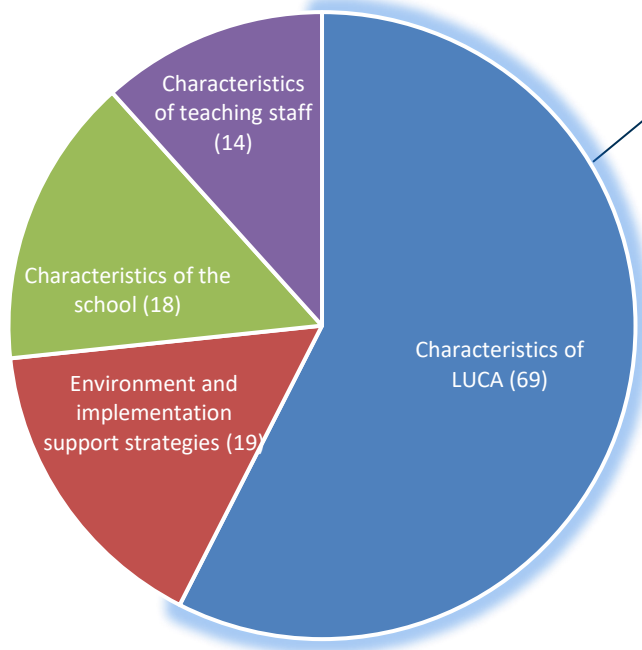
Authenticity (18), **ease of use** (12) and the **share economy** (7) are particularly valued. LUCA is also perceived as an **effective teaching and learning method** (19).

- "After a certain time, an email comes into the inbox just like in real life. It's not just mindless processing of tasks, but unexpected things can happen in between."

Findings
Perception of LUCA by teachers

Perceived facilitating factors for the implementation (120 statements)

Authenticity (18), **ease of use** (12) and the **share economy** (7) are particularly valued. LUCA is also perceived as an **effective teaching and learning method** (19).
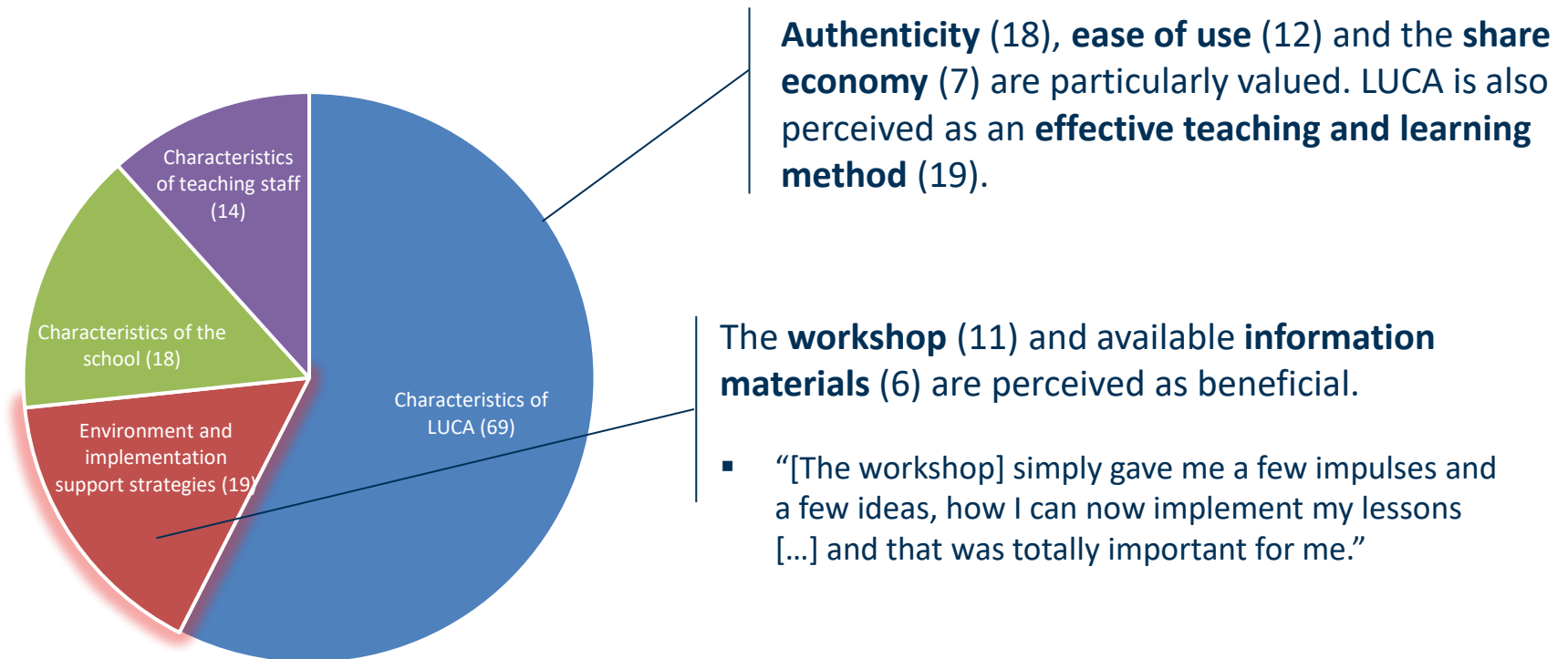
The **workshop** (11) and available **information materials** (6) are perceived as beneficial.

- "[The workshop] simply gave me a few impulses and a few ideas, how I can now implement my lessons […] and that was totally important for me."

Findings
Perception of LUCA by teachers

Perceived impeding factors for the implementation (83 statements)

Characteristics of learners (4)

Characteristics of teaching staff (1)

Characteristics of the school (10)

Characteristics of LUCA (33)

Environment and implementation support strategies (35)

Especially the **ease of use** (14), **limited functionality of office tools** (10) and the **share economy** (2) are criticized.

"I don't understand the scoring tool. I'm really struggling with it."

Most statements about obstacles to implementing LUCA are related to the **resource of time** (33) particularly the familiarisation with LUCA and the development of own work scenarios.

"I have various topics going on, so I simply didn't have the time to deal with it in more detail. "

Conclusion and Discussion

- Learners perceive the office simulation as engaging and realistic while identifying several improvement areas.

- Teachers value the simulation's authenticity and workshops for implementing LUCA in the classroom. Major implementation challenges are related to time constraints and difficulties in using the software.

- Lessons learned from LUCA:

  - Importance of ease of use and authenticity

  - Promote the implementation: ensure that teachers have sufficient time; offer proper induction and support

Limitations

- Learners: small number of self-report items; evaluation of only one scenario.

  ➢ Further usability studies could provide additional insights.

- Teachers: small sample size, perceived conditions for implementation may vary over time.

  ➢ Surveying teachers at multiple points in time may be informative.

Contact

University of Mannheim
Chair of Economic and Business Education –
Professional Teaching and Learning

✉ *Sophia Gentner, M.Sc.*
sophia.gentner@uni-mannheim.de

🏠 Project Website: www.luca-office.de 🇩🇪

Linked in Group: LUCA Office Simulation 🇩🇪
https://www.linkedin.com/groups/12504162/

References

Caruso, J. V. (2019). Using Business Simulations to Prepare Students to Think Critically, Make Better Decisions, and Solve Business Problems. *Developments in Business Simulation and Experiential Learning, 46*, 283–295.

Chernikova, O., Heitzmann, N., Stadler, M., Holzberger, D., Seidel, T., & Fischer, F. (2020). Simulation-Based Learning in Higher Education: A Meta-Analysis. *Review of Educational Research, 20*(10), 1-43. https://doi.org/10.3102/0034654320933544

Frey, C. B.; Osborne, M. A. (2017). The future of employment: How susceptible are jobs to computerisation? *Technological Forcasting and Social Change, 114*(C), 254–280. https://doi.org/10.1016/j.techfore.2016.08.019

Plass, J. L.; Schwartz, R. N. (2014). Multimedia Learning with Simulations and Microworlds. In R. E. Mayer (Ed.), The Cambridge Handbook of Multimedia Learning (pp. 729–761). Cambridge University Press. https://doi.org/10.1017/CBO9781139547369.036

Rausch, A.; Deutscher, V.; Seifried, J.; Brandt, S.; Winther, E. (2021). Die web-basierte Bürosimulation LUCA – Funktionen, Einsatzmöglichkeiten und Forschungsausblick. *Zeitschrift für Berufs- und Wirtschaftspädagogik, 117*(3), 372-394.

Schrepp, M.; Hinderks, A.; Thomaschewski, J. (2017). Design and evaluation of a short version of the user experience questionnaire (UEQ-S). *International Journal of Interactive Multimedia and Artificial Intelligence, 4*(6), 103-108. https://doi.org/10.9781/ijimai.2017.09.001