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OER Recommendation System to Support Goal-Driven Learning

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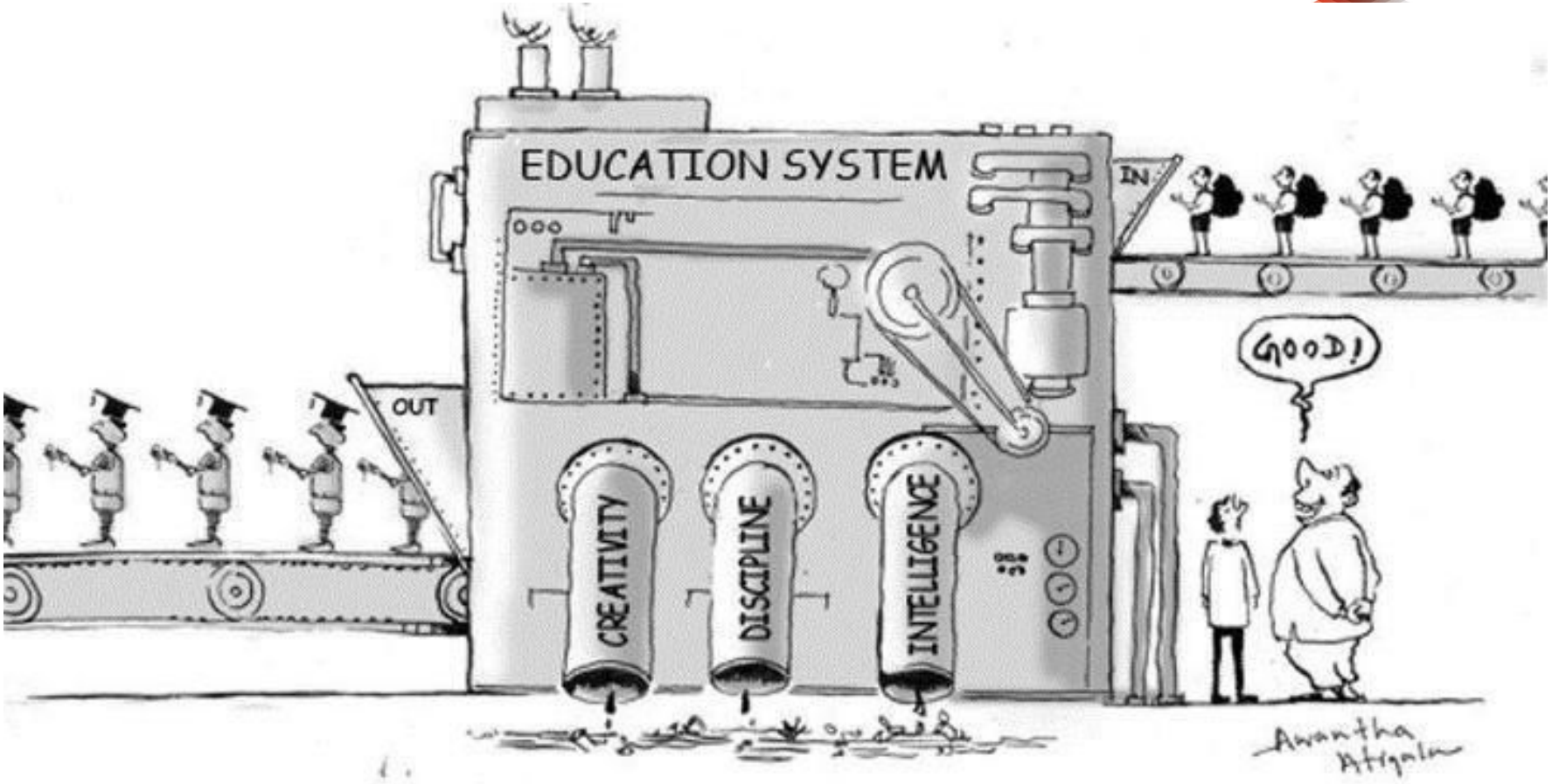
Online Educa Berlin 2021

Leibniz Association

Annoying Factor in our Education Experience



Personalization of Learning

Learning is personal, driven by a great number of individual goals and contexts

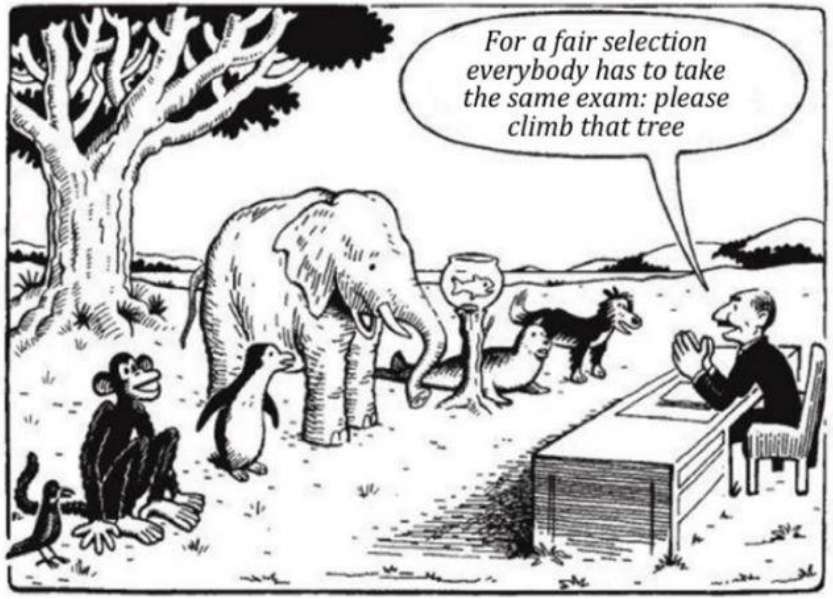


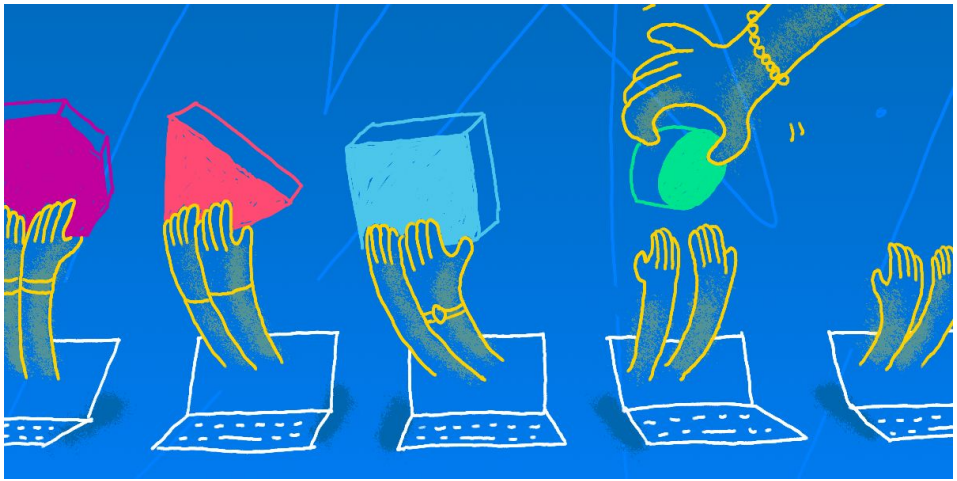
Image:
https://www.psychologytoday.com/us/blog/finding-the-next-einstein/201404/do-we-have-trouble-taking-objective-feedback

What are the new **Responsibilities**?

New Responsibilities

- **Teaching Side**
  - Guide in terms of
    - Educational Recommendation
    - Assessment Service

- **Learning Side**
  - Set and edit goals
  - Interact with the system



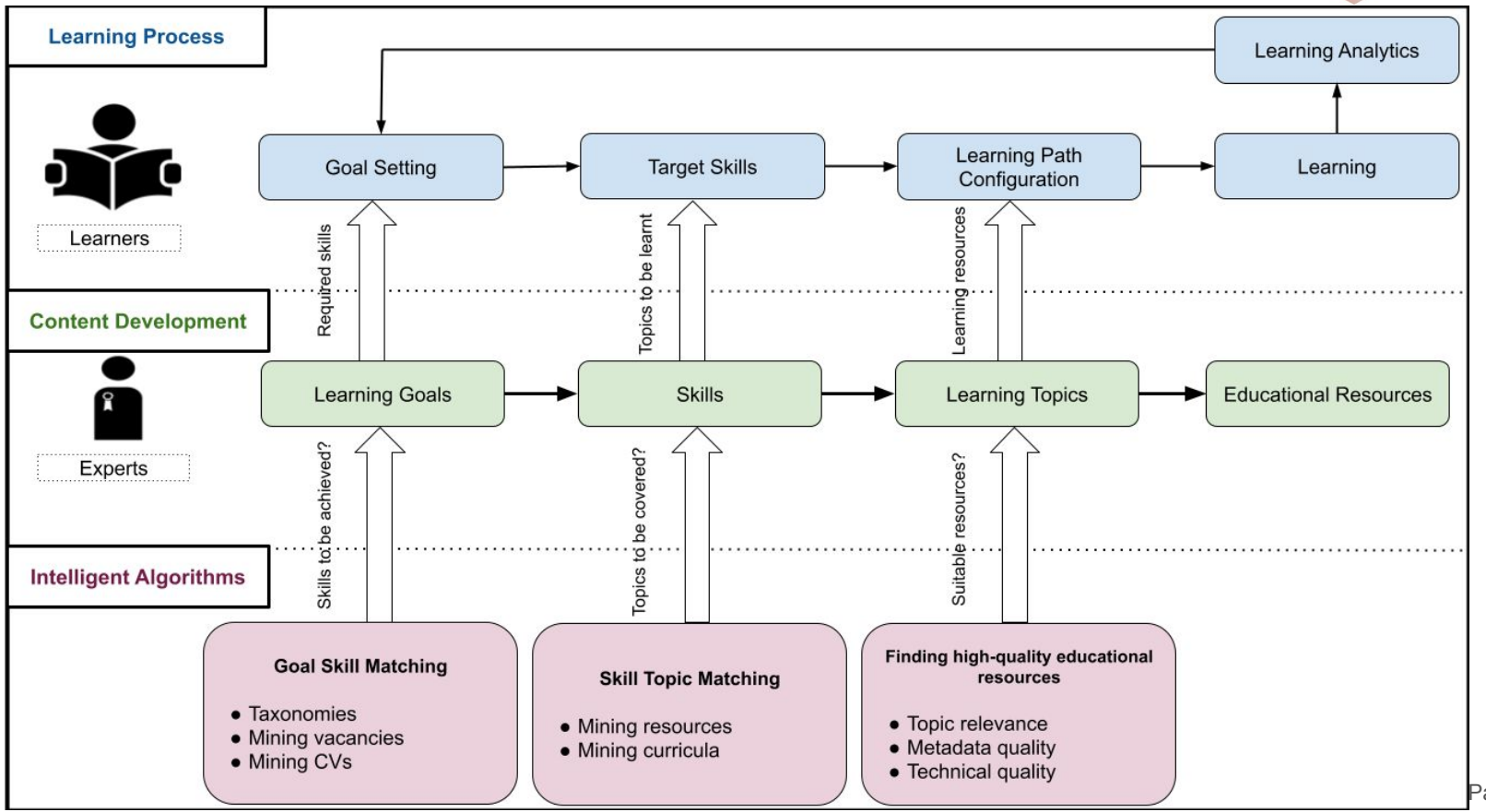
From schoolbox.com

General objective

Empower learners through inclusive personalised learning and curriculum recommendations, on the basis of different learning goals and open/online educational resources

Why OER?

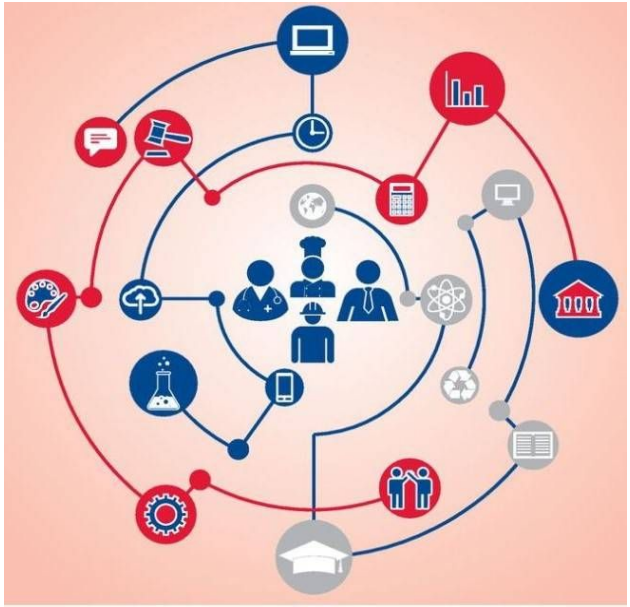
Concept Overview



From thenounproject.com by Vector Portal and Margot Lnrs

Research Challenges

- **Matching learning goals with their required skills**
  - Focus on the labour market driven goals
  - Using job vacancies and standard taxonomies
- **Learning topics that should be covered for achieve a skill**
  - Extracting topics from educational resources



From workplaceinsight.net

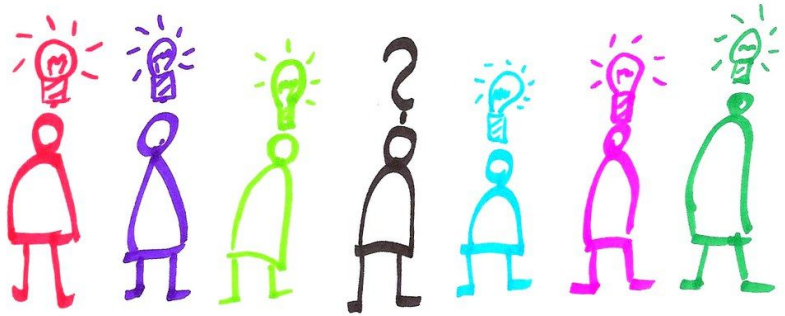
Research Challenges (Cont'd)

- **Huge amount of educational content**
  - Quality assurance
    - Metadata quality
    - Relevancy quality
    - Technical quality
  - Extracting their properties
    - E.g. covered-topic

- **Recommending educational content**

Scalable Solution

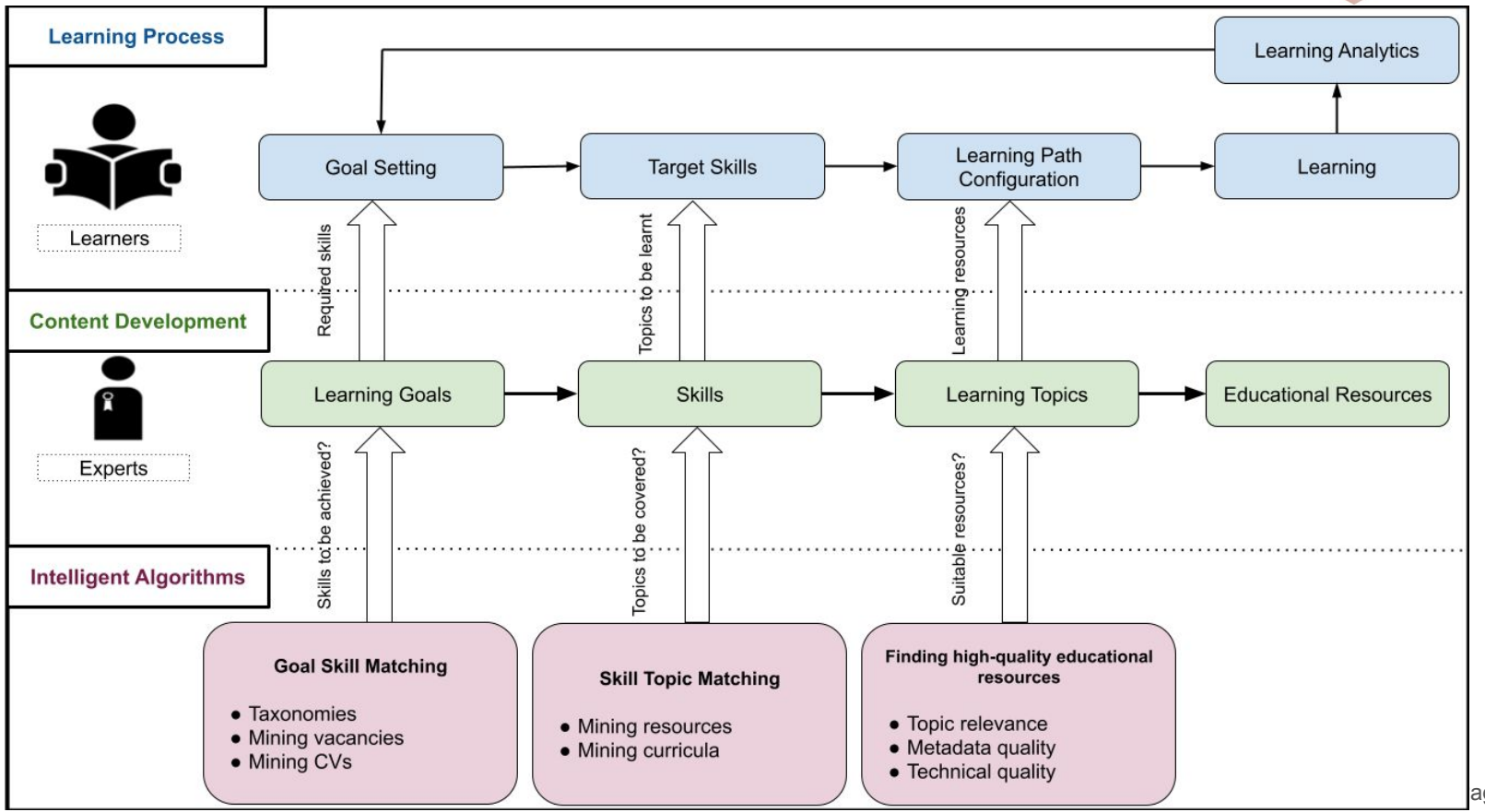
- **How to make our solution *scalable***
  - **Shortcomings of AI based algorithms**
  - **Crowdsourcing**
    - Jobs, Skills, Topics, Educational Materials
    - Shortcomings of Crowdsourcing approaches
  - **Hybrid approach** (AI + Crowdsourcing)



http://edoer.eu/

Open, community based, AI-driven learning platform

To summarize



From thenounproject.com by Vector Portal and Margot Lnrs

Validation

- **175 people** (Prolific.co, tool for crowdsourcing in research)

- **Groups**
  - **Group 1**: control group (without using eDoer)
  - **Group 2**: Using eDoer but without personalization
  - **Group 3**: Using eDoer and receiving personalized recommendations

- **Pretest, Posttest**
  - Progress score = Posttest - Pretest

Validation (Cont'd)

- **Hypothesis 1:** Has eDoer any effect on the learning process? (Statistically significant difference)

- **Hypothesis 2:** Has eDoer's personalized recommendations any effect on the learning process? (Not statistically significant difference, but Group3 did better than Group 2)

Next Steps

- **Adding content**
- **Improving our intelligent models**
- **Capturing mental status of learners**
  - E.g. tiredness

- **Road map**
  - How human and AI can work together in this environment
  - Unsupervised personalized learning recommendation

Publications - Conceptual framework

- Tavakoli, M., Hakimov, S., Ewerth, R., & Kismihók, G. (2020, July). A recommender system for open educational videos based on skill requirements. In *2020 IEEE 20th International Conference on Advanced Learning Technologies (ICALT)* (pp. 1-5). IEEE.

- Tavakoli, M., Mol, S. T., and Kismihók, G. (2020). Labour Market Information Driven, Personalized, OER Recommendation System for Lifelong Learners. In the 12th International Conference on Computer Supported Education (CSEDU 2020)

- Tavakoli, M., Faraji, A., Mol, S. T., & Kismihók, G. (2020, October). OER Recommendations to Support Career Development. In *2020 IEEE Frontiers in Education Conference (FIE)* (pp. 1-5). IEEE.

- Tavakoli, M., Faraji, A., Molavi, M., & Kismihók, G. (2022). Hybrid Curriculum Development for Personalised Informal Learning Environments. Accepted to be published in the 12th International Learning Analytics and Knowledge (LAK'2022), March 21--25, 2022. ACM.

Publications - Educational content analysis

- Tavakoli, M., Elias, M., Kismihók, G., & Auer, S. (2021). Metadata Analysis of Open Educational Resources. In the 11th International Learning Analytics and Knowledge (LAK'2021), April 12--16, 2021. ACM.

- Tavakoli, M., Elias, M., Kismihók, G., & Auer, S. (2020, July). Quality prediction of open educational resources a metadata-based approach. In *2020 IEEE 20th International Conference on Advanced Learning Technologies (ICALT)* (pp. 29-31). IEEE.

- Elias, M., Oelen, A., Tavakoli, M., Kismihok, G., & Auer, S. (2020, September). Quality Evaluation of Open Educational Resources. In *European Conference on Technology Enhanced Learning* (pp. 410-415). Springer, Cham.

- Molavi, M., Tavakoli, M., & Kismihók, G. (2020, September). Extracting Topics from Open Educational Resources. In *European Conference on Technology Enhanced Learning* (pp. 455-460). Springer, Cham.

Publications - Others

- Ilkou, E., Abu-Rasheed, H., Tavakoli, M., Hakimov, S., Kismihók, G., Auer, S., & Nejdl, W. (2021). EduCOR: An Educational and Career-Oriented Recommendation Ontology. International Semantic Web Conference. Springer, Cham, 2021.

- Elias, M., Tavakoli, M., Lohmann, S., Kismihok, G., & Auer, S. (2020, October). An OER Recommender System Supporting Accessibility Requirements. In *The 22nd International ACM SIGACCESS Conference on Computers and Accessibility* (pp. 1-4).

Projects support our development

ADSEE - Applied Data Science Educational Ecosystem

OSCAR - Online, open learning recommendations and mentoring towards Sustainable research CAReers

ADAPT - Implementation of an Adaptive Continuing Education Support System in the Professional Field of Nursing

BIPER - Business Informatics Programme Reengineering

WBsmart - AI-based digital continuing education space for elderly care

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Thanks for your attention!

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