Metinė ataskaitinė informatikos inžinerijos krypties doktorantų konferencija

Išplėstas informatikos konceptų ir kompetencijų ugdymo modelis

(EXTENDED MODEL OF INFORMATICS CONCEPTS AND COMPETENCES EDUCATION)

Studijų laikas 2014 m. – 2018 m.

Studentė Gabrielė Stupurienė

Vadovė Prof. dr. Valentina Dagienė

2018-10-25

Tyrimo objektas – informatikos konceptai ir kompetencijos.

Tyrimo tikslas – išplėsti informatikos konceptų ir kompetencijų ugdymo modelį.

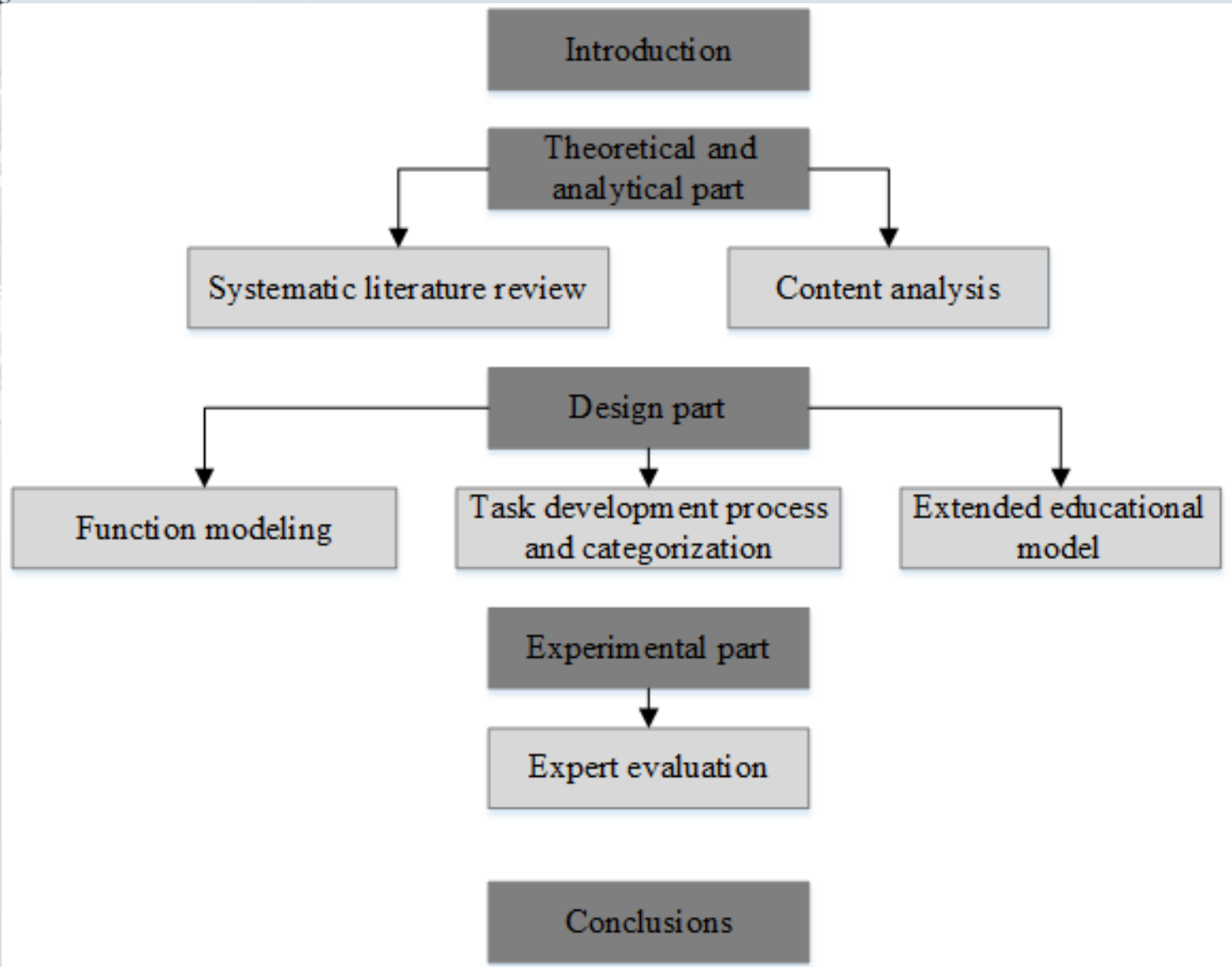
Uždaviniai

1. Atlikti literatūros apžvalgą pagrindinių informatikos konceptų ypatumų ir su jais susijusių mokslinių problemų identifikavimui.
2. Nustatyti pagrindinį informatikos konceptų ir kompetencijų rinkinį, naudojant funkcinio modeliavimo metodą.
3. Sukurti dviejų dimensijų kategorizavimo sistemą informatikos mokomosioms užduotims klasifikuoti. Ši sistema integruoja informatinio mąstymo įgūdžius ir informatikos konceptus.
4. Išplėsti informatikos konceptų ir kompetencijų ugdymo modelį.
5. Atlikti ekspertinį modelio vertinimą.

Tyrimų metodai

- Sisteminė literatūros analizė ir turinio analizė buvo naudojama palyginti ir analizuoti kitų tyrimų rezultatus.
- Taikomi įvairūs duomenų modeliavimo ir funkcinio modeliavimo metodai.
- Ekspertinis vertinimas naudojamas pasiūlytam išplėstiniam modeliui įvertinti.

Darbo struktūra



Aprobavimas (1)

Articles in the reviewed scientific periodical publications:

1. Dagienė, Valentina; Sentance, Sue; Stupurienė, Gabrielė. Developing a two-dimensional categorization system for educational tasks in informatics // Informatica. Vilnius: Matematikos ir informatikos institutas. ISSN 0868-4952. 2017, Vol. 28, No 1, p. 23-44.
2. Dagienė, Valentina; Stupurienė, Gabrielė, Vinikienė, Lina. Implementation of Dynamic Tasks on Informatics and Computational Thinking// Baltic journal of modern computing. Riga: Latvijas Universitate. ISSN 2255-8942. eISSN 2255-8950. 2017, Vol. 5, No. 3, p. 306-316.
3. Izu, Cruz; Mirolo, Claudio; Settle, Amber; Mannila, Linda; Stupurienė, Gabrielė. Exploring Bebras tasks content and performance: a multinational study // Informatics in education. Vilnius: Matematikos ir informatikos institutas. ISSN 1648-5831. eISSN 2335-8971. 2017, Vol. 16, No. 1, p. 39-59.
4. Dagiene, V., Stupuriene, G. (2016). Informatics Concepts and Computational Thinking in K-12 Education: A Lithuanian Perspective. Journal of Information Processing, 24(4), 732-739 (Invited paper).
5. Dagienė, V., Stupurienė, G. Bebras - a sustainable community building model for the concept based learning of informatics and computational thinking, Informatics in Education, Vol. 15 (1), p. 25-44, 2016.
6. Dagienė, V., Pėlikis, E., Stupurienė, G. Introducing Computational Thinking through a Contest on Informatics: Problem-solving and Gender Issues. Informacijos mokslai, 2015, 73, 43-51.

Aprobavimas (2)

Proceedings of scientific conference:

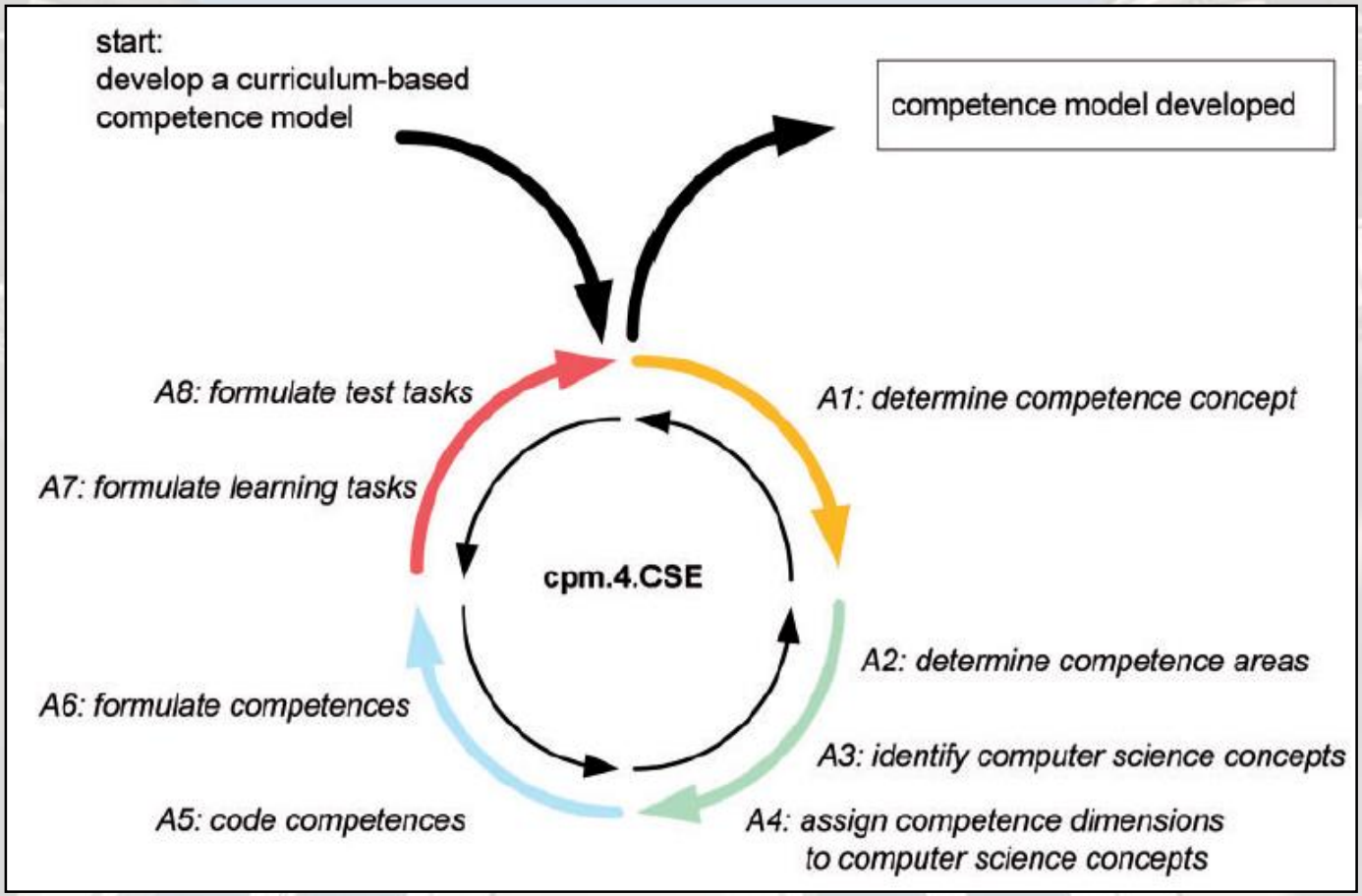
1. Dagienė, Valentina; Stupurienė, Gabrielė. Short tasks - big ideas: constructive approach for learning and teaching of informatics concepts in primary education // Constructionism 2018: Constructionism, computational thinking and educational innovation: conference proceedings. Vilnius University, 2018. eISBN 9786099576015. p. 169-179.
2. Dagienė, Valentina; Stupurienė, Gabrielė; Vinikienė, Lina. Informatics based tasks development in the Bebras contest management system. Communications in Computer and Information Science. Vol. 756. ISSN 1865-0929, eISSN 1865-0937, p. 466-477, 2017.
3. Dagiene, V., Stupuriene, G., Vinikiene, L., & Zakauskas, R. (2017). Introduction to Bebras Challenge Management: Overview and Analyses of Developed Systems. In International Conference on Informatics in Schools: Situation, Evolution, and Perspectives (pp. 232-243). Springer, Cham.
4. Dagienė, V., Stupurienė, G., Vinikienė, L. (2016). Promoting Inclusive Informatics Education Through Bebras Challenge to All K-12 Students. In: Proceedings of the 17th International Conference on Computer Systems and Technologies, ACM.
5. Stupurienė, G., Vinikienė, L., & Dagienė, V. (2016). Students' Success in the Bebras Challenge in Lithuania: Focus on a Long-Term Participation. In: International Conference on Informatics in Schools: Situation, Evolution, and Perspectives (pp. 78-89). LNCS, Vol. 9973, Springer International Publishing.
6. Barendsen, Erik; Mannila, Linda; Demo, Barbara; Grgurina, Nataša; Izu, Cruz; Mirolo, Claudio; Sentance, Sue; Settle, Amber; Stupurienė, Gabrielė. Concepts in K-9 Computer Science Education // ITICSE '15: Innovation and Technology in Computer Science Education Conference, Vilnius, Lithuania - July 04 - 08, 2015. ISBN 9781450341462. p. 85-116.

Aprobavimas (3)

International conferences and doctoral consortiums:

1. International conference Constructionism 2018: Constructionism, computational thinking and educational innovation. August 21-25, Vilnius, Lithuania.
2. 8th International doctoral consortium on informatics engineering education research, December 6-10, 2017, Druskininkai, Lithuania.
3. The 10th International Conference on Informatics in Schools (ISSEP) and doctoral consortium, 2017, November 12-15, Helsinki, Finland.
4. International conference Constructionism in Action, February 1-5, 2016, Bangkok, Thailand.
5. 6th International doctoral consortium on informatics engineering education research, December 08 – 12, 2015, Druskininkai, Lithuania.
6. 20th Annual Conference on Innovation and Technology in Computer Science Education (ITICSE), July 6-8, 2015, Vilnius, Lithuania.
7. International IFIP TC3 Working Conference "A New Culture of Learning: Computing and next Generations", July 1-3, 2015, Vilnius, Lithuania.
8. 5th International doctoral school on informatics education and educational software engineering research, November 26 – 30, 2014, Druskininkai, Lithuania.

Kompetencijų modelis informatikos mokymui (cpm.4.CSE)



Zendler, A., Seitz, C., & Klaudt, D. (2016). Process-Based Development of Competence Models to Computer Science Education. *Journal of Educational Computing Research*, *54*(4), 563-592.

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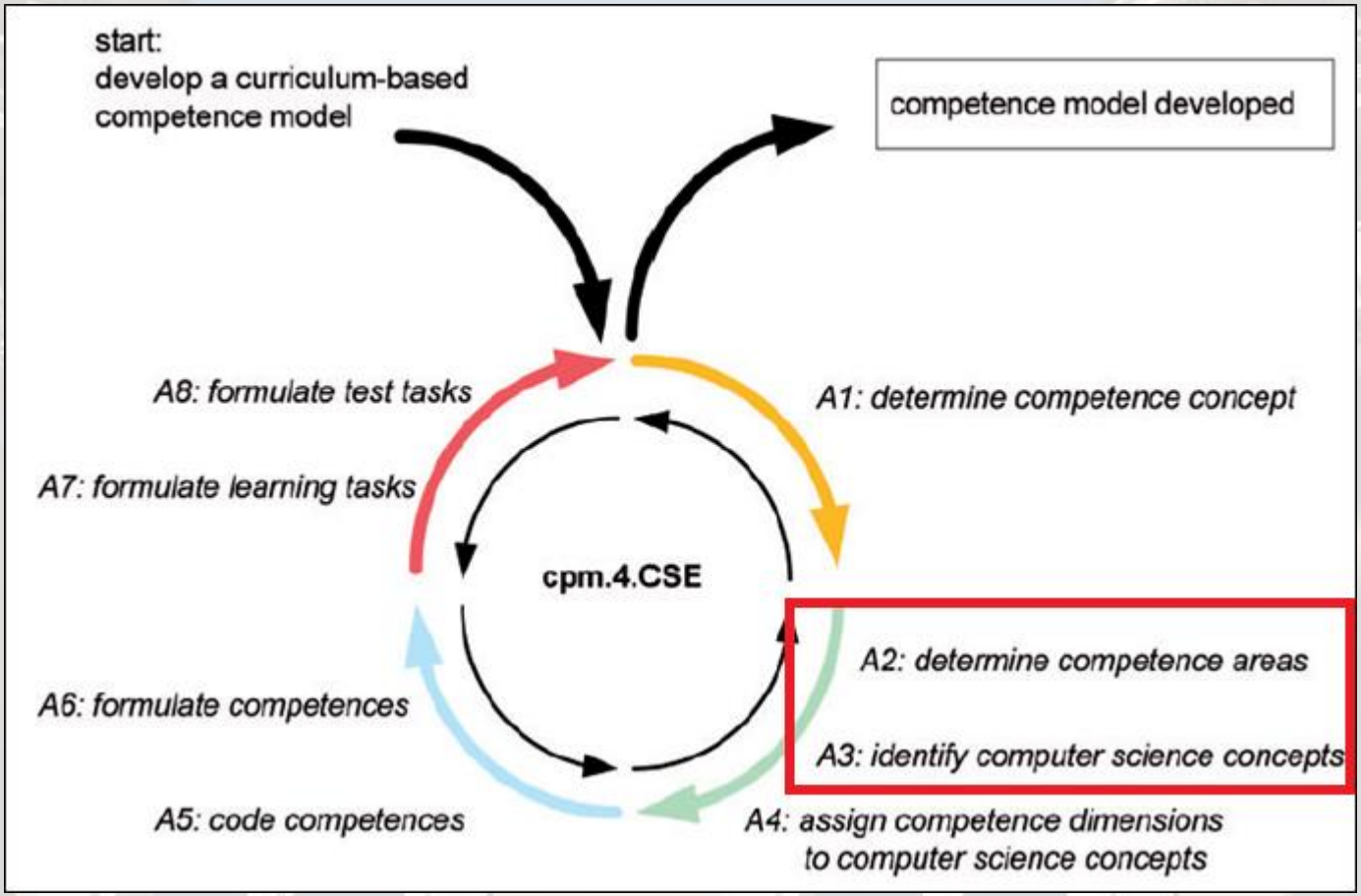
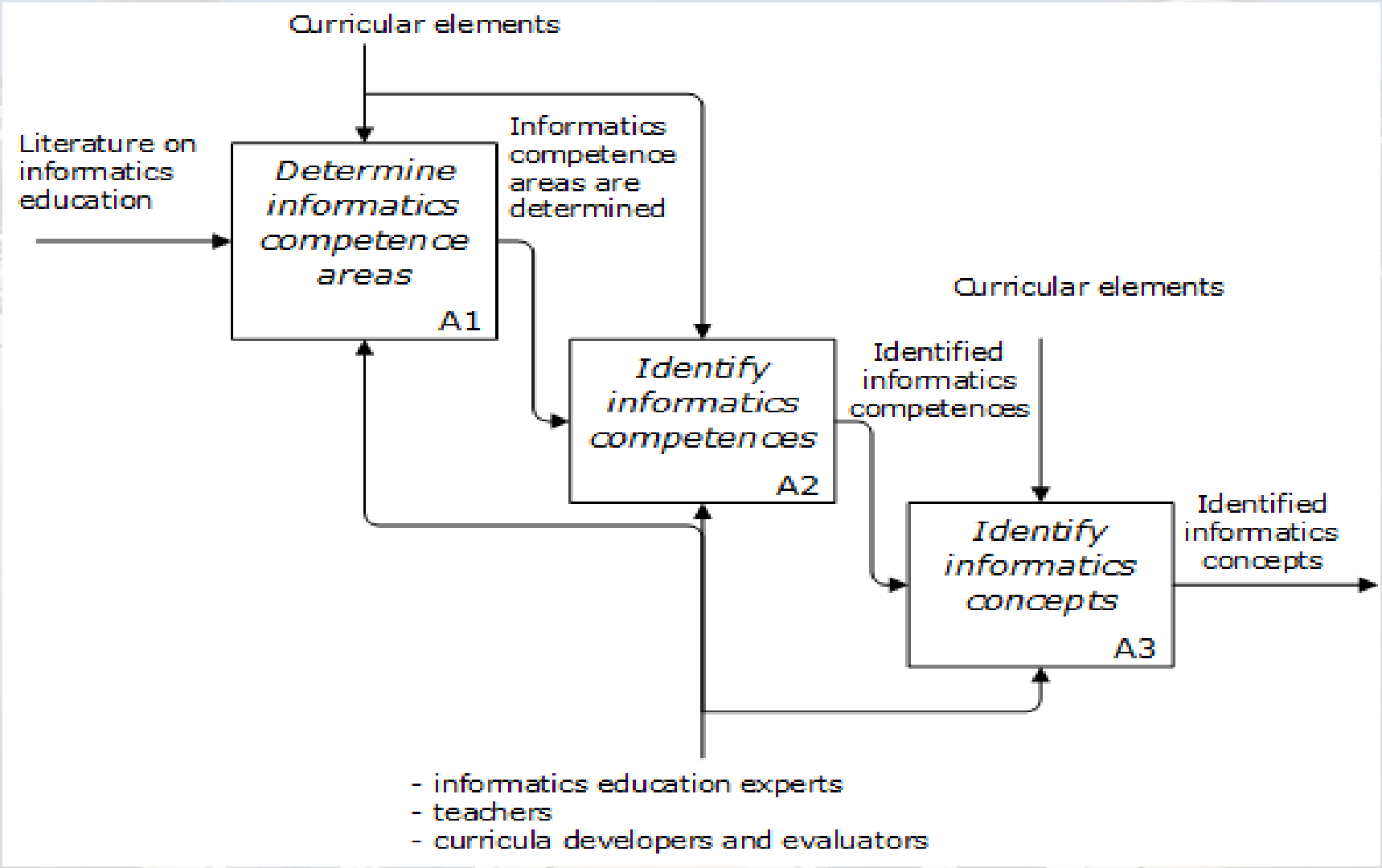


Zendler, A., Seitz, C., & Klaudt, D. (2016). Process-Based Development of Competence Models to Computer Science Education. *Journal of Educational Computing Research*, *54*(4), 563-592.

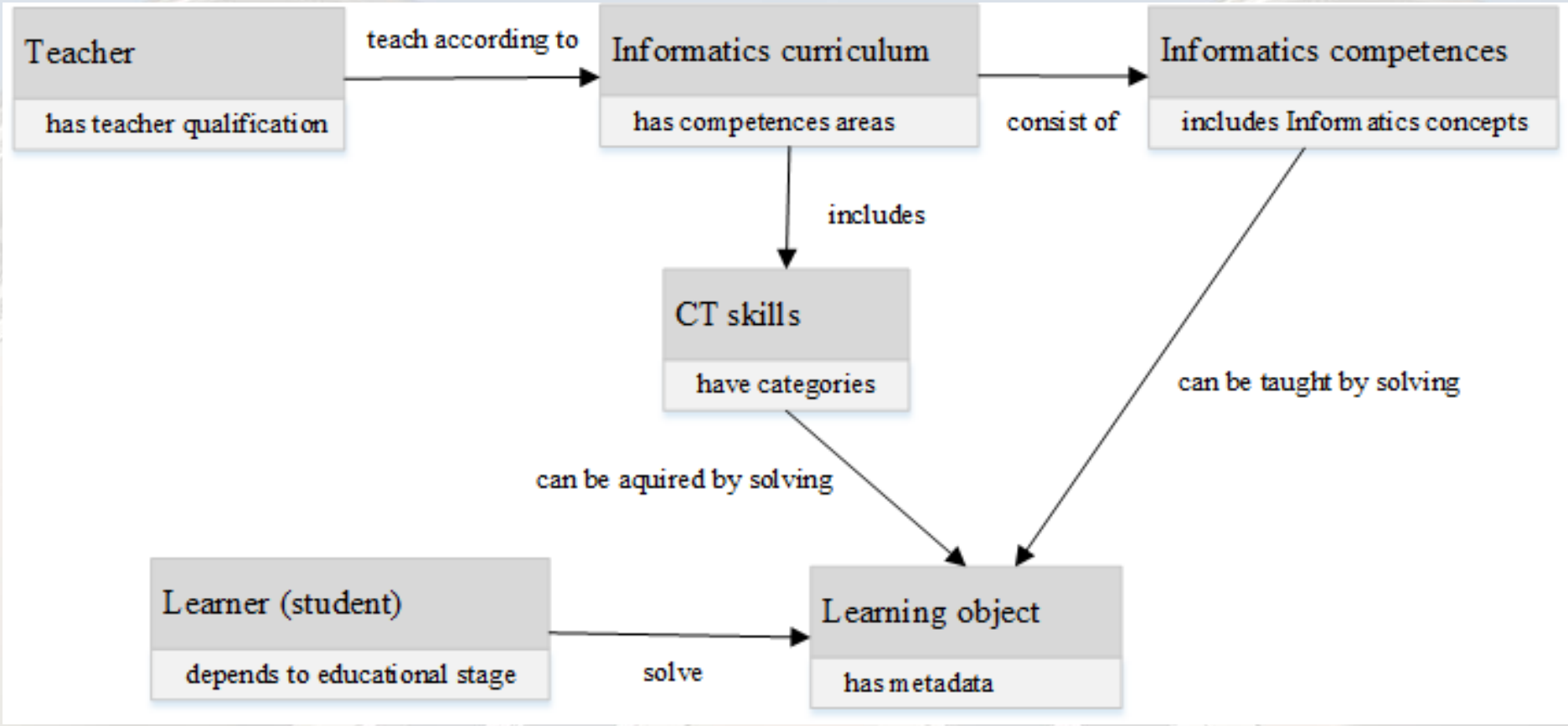
Konceptų identifikavimo procesas



Identifikuotos kompetencijų sritys ir kompetencijos

Competences area	*Competences*
Digital content	Become familiar with a variety of digital content
	Use of digital content
	Word, Spreadsheet, Drawing, Multimedia processing
	Evaluate, develop and share digital content
Algorithms and programs	Understands the benefits of an algorithm, program
	Performs the sequence of actions indicated by the commands
	Uses commands and logical operations
	Creates and executes programs
	Searches for debugs, tests and upgrades
Problem solving	Finds out the challenges posed by digital technology
	Creatively use of digital technology
	Selects and combines of digital technologies
	Evaluation of digital abilities
Data and information	Understands the importance of data and information
	A targeted search for information
	Performs a variety of actions with the data: collect, store, group, sort
	Evaluate the suitability and reliability of information
Virtual communication	Understands the nature of communication in the virtual space
	Communicate by using digital technology
	Collaborate, share experiences and resources
	Assesses the risk of virtual communication
Safety and protection	Protecting devices
	Personal data and privacy
	Manages digital identity
	Protecting environment
	Copyright and licenses

E-R diagrama


Teacher
has teacher qualification
teach according to
Informatics curriculum
has competences areas
consist of
Informatics competences
includes Informatics concepts
includes
CT skills
have categories
can be taught by solving
can be aquired by solving
Learner (student)
depends to educational stage
solve
Learning object
has metadata

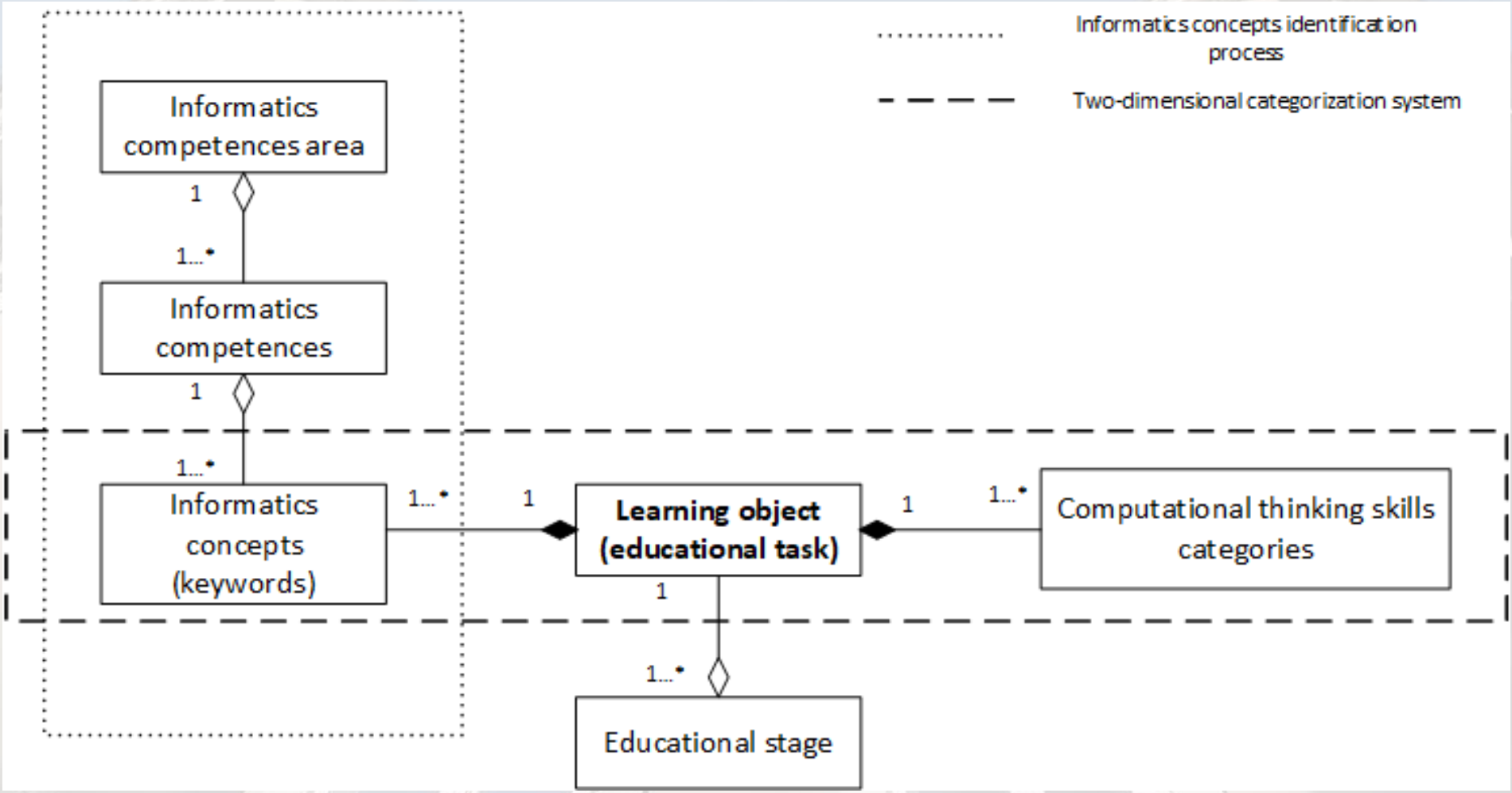
Two-dimensional categorization system for informatics learning tasks

Categorization system is suggested and dedicated to classify informatics learning tasks. This system helps teachers of informatics to choose the content of lesson and effectively select the learning tasks according to the particular topic of theoretical informatics.

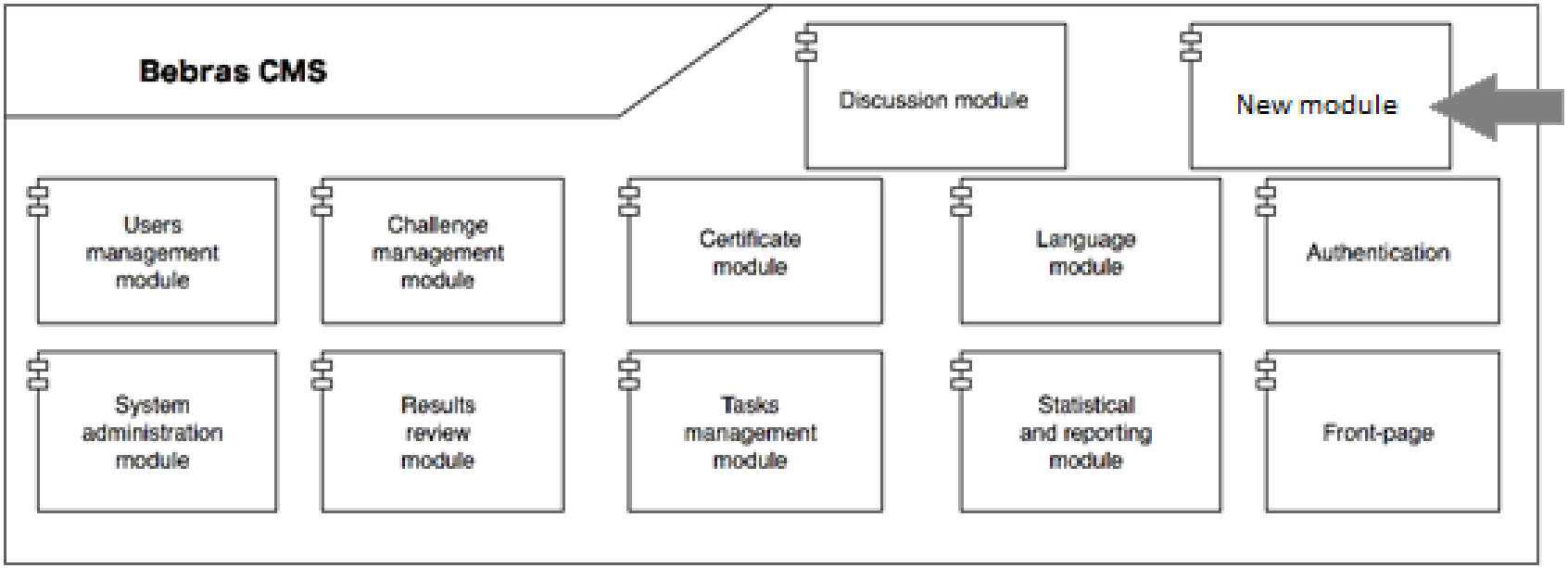
	Data, Data Structures, and Representations	Algorithms and Programming	Computer Processes and Hardware	Communication and Networking	Interactions, Systems, and Society
Abstraction					
Algorithmic thinking					
Decomposition					
Evaluation					
Generalisation					

Dagienė, V., Sentance, S., & Stupurienė, G. (2017). Developing a Two-Dimensional Categorization System for Educational Tasks in Informatics. *Informatica*, *28*(1), 23-44.

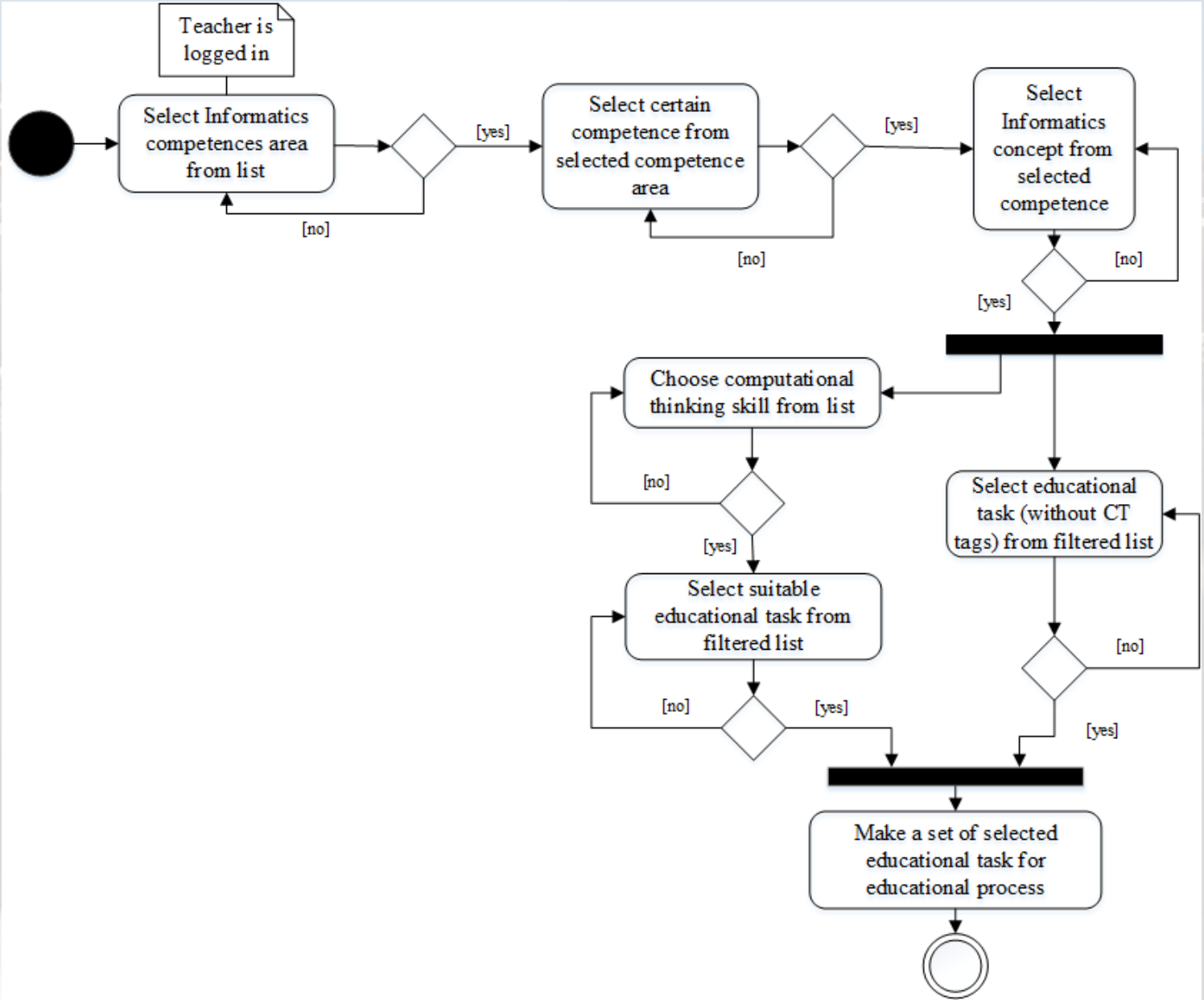
Išplėsto modelio duomenų modelis



CMS papildymas nauju moduliu



Veiklos diagrama



Dėkoju

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