G-1 Primena igara za učenje koncepata iz oblasti računarstva

Prikazati principe primene igara za učenje (Game based learning). Dati sistematičan pregled stanja u literaturi i industriji u pogledu igara za pomoć učenju koncepata iz oblasti računarstva.

• F1: Inicijalni skup izvora; identifikacija kategorija; draft rada.

• F2: Sistematizacija rezultata; konačan oblik rada

Sa najmanje 30 izvora.

Polazna osnova: Pretraga literature "game based learning" "computer science" "programming"

**Beleške sa časa „Prezentacija tema“:**

**- primena igara ali striktno u oblasti računarstva**

**- koju ulogu mogu da igraju igre u oblasti računarstva**

**- izvora je puno, pa je cilj dati sistematičan pregled, dakle ne samo spisak, već i da se kategorizuju**

Pitanja za kick-off:

* Da li da obratimo pažnju i na igre koje pomažu deci u upoznavanju sa konceptima iz oblasti računarstva (uzrast: osnovna škola) ili samo na one koje pomažu učenicima srednjih škola i studentima?
* Da li su u temu uključene i igre koje služe kao pomoć učenju nekog konkretnog programskog jezika ili samo koncepata?
* ...

**Beleške sa časa „Kick-off“:**

* **...**

**[** [**https://stemeducationjournal.springeropen.com/articles/10.1186/s40594-023-00447-2**](https://stemeducationjournal.springeropen.com/articles/10.1186/s40594-023-00447-2) **]**

**[**Various block-based programming languages, which are also accessible online (**Scratch, Snap, Blockly**), are used to develop students' computational thinking and block-based programming skills, especially in primary education. In addition, they support the development of interactive projects that students can use afterward. Moreover, students can develop animations, interactive stories, and games, which allow them to engage in the coding process, learn programming concepts and even learn about other computer science topics during game design.

Topics connected with programming are the most common in computer science, but learning how to program is often recognized as a frustrating activity. Learning object-oriented programming languages is especially difficult for students, because programming concepts are complex, cognitively demanding, require algorithmic thinking and problem-solving skills, and is a long-term process. Game-based learning stimulates active learning and enables students to learn about programming concepts in fun and engaging ways through visual interfaces and engaging environments (**CodeCombat, Alice, Greenfoot**). Those engaging and motivating environments enable simplifying complex programming concepts, such as inheritance, nested loops, and recursion.

Different pedagogical strategies can be used to implement game-based learning in computer science, empowering students' skills and increasing their active engagement in learning. For example, students can deepen their knowledge and skills on a given topic by playing the game or through the process of game design. In both cases, the game-based approach can increase students' motivation and engagement in learning.]

Nađeni izvori do sada:

<https://codecombat.com> „Learn to Code Through the Power of Play“. It works well for both kids and adult learners. You can create a free account and learn the fundamentals of programming like loops, functions, conditionals, and variables. You can choose which programming language to start with and work your way through the games. You also have the option to upgrade to the premium account if you are interested in having access to more levels.

* <https://www.ozaria.com> „A coding adventure for students and your turnkey solution for teaching Computer Science.“

<https://www.codemonkey.com/> „Coding for kids; Introducing programming games for the next generation“

<https://play.google.com/store/apps/details?id=air.MusterenGames.ElHarezmiCoding&hl=en_US>

**Ages:** 8+, **Format:** Android „Algorithm City is a 3D style game where kids can learn the basic concepts of programming, such as command sequencing, functions and loops, and more. Play and code to make a character progress by collecting gold and solving levels.“

<https://grasshopper.codes/> **Ages:** Varies, **Format:** iOS/Android „This app, created by Google, teaches [JavaScript for kids](https://www.codewizardshq.com/javascript-for-kids/) through mini-games they can play. It offers two courses: one for brand new coders and another for more advanced coders. For beginners, the app will take you through a set of slides explaining the basics of how to code followed by a short quiz to review and improve their understanding.“

<https://www.codingame.com/start> CodinGame is a site that helps you work on problem solving skills and learn programming basics through a turn-based game. This platform supports over 25 different programming languages and gives players the opportunity to practice, learn, and compete in coding contests. Once you create an account, you can get started with the beginner level onboarding section. You will be introduced to standard programming concepts and solve mini challenges.

<https://flukeout.github.io/> In CSS Diner, you can practice the basics of CSS through a series of 32 challenges. This is a good way to get more familiar with the language and have fun learning it. The first few challenges are short and focus on working with classes and ids. But as you progress through the levels, you will be introduced to Pseudo-selectors, First of Type Selector, Last of Type Selector, and the Universal Selector.

<https://flexboxfroggy.com/> In Flexbox Froggy, you will learn CSS Flexbox by placing the frogs on the correct lillypads. By the time you finish level 24, you should feel comfortable using Flexbox in your next project. Each challenge provides a description on the Flexbox properties. The first few challenges start off easy but as you progress in the game things get more complicated.

<http://www.flexboxdefense.com/> Flexbox Defense is a tower defense game that helps you strengthen your CSS skills. Position the towers to keep out your enemies using CSS Flexbox. The challenges will provide you with definitions of the Flexbox properties. Once you write your code, press the Start Wave button and see if you were successful in stopping your enemies.

<https://cssgridgarden.com/> Learn CSS Grid by going through 28 levels of Grid Garden. Some familiarity with CSS Grid is encouraged but not required for getting started with the game. Each challenge provides a description on the CSS Grid properties. The first few challenges start off easy but as you progress in the game things get more complicated.

<https://scratch.mit.edu/> MIT's Scratch is a block based programming language where you can learn about events, conditionals, variables, and more by building your own games and animations. Choose from dozens of sprites, sounds and backgrounds to code your own creations and start understanding programming basics. Scratch is also used during the first week of Harvard's CS50: Introduction to Computer Science course.

<https://www.tynker.com/> Tynker is a site where you can build projects and play games using HTML, CSS, JavaScript, Python, and Java. They have an extensive list of projects, algorithms and data structure challenges. You can build these projects in the online editor and share your creations within the community. This site is aimed at kids between the ages of 5-18.

<https://mystery.knightlab.com/> SQL Murder Mystery is great for both beginners and experienced SQL developers. Strengthen your SQL and problem solving skills by trying to track down the killer in this murder mystery. The game uses SQLite and you will first have to get acquainted with the database structure before starting the game. If you are new to SQL, there is a detailed walk through for beginners. Otherwise, if you are an experienced SQL user then you can dive straight into the game.

<https://alexnisnevich.github.io/untrusted/> Untrusted is an adventure game where you can test your JavaScript and problem solving skills. Help guide Dr. Eval through a series of levels by solving JavaScript challenges. If you are brand new to JavaScript then this game might be a little advanced for you. But if you have spent some time programming in JavaScript then the challenges will be doable.

<http://play.elevatorsaga.com/> Elevator Saga is a JavaScript game where you will go through a series of challenges trying to transport people in elevators in the most efficient way possible within the time given. Once you modify the code, you can test the efficiency of your solution by clicking the start button in the top right hand corner. When the program is running, you can check the stats to see if you passed the challenge or not.

<https://checkio.org/> CheckiO is a strategy game where you can learn TypeScript or Python through a series of challenges. Once you create a free account, you will start off with the beginner challenges and work your way through to the advanced ones. The game will give you access to hints and other players' solutions if you need help. You will solve each of the challenges in the online editor and move onto the next mission when the task is solved.