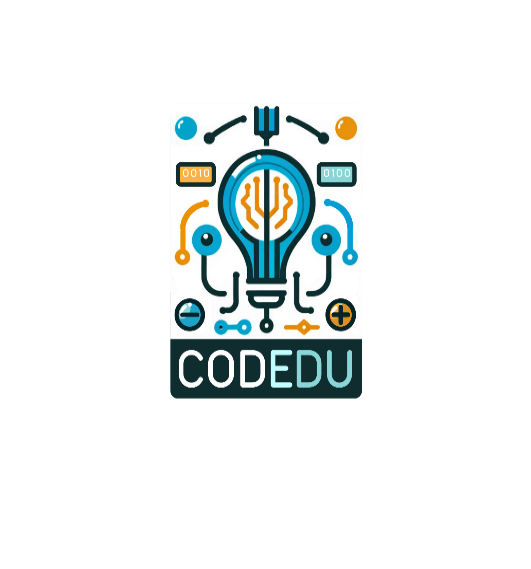
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| **CODEDU’s Students’ Training Course** | | | | | | |
| **Section 1: Introduction to Innovative Learning** | | | | | | |
| **Subject: Innovative learning methods** | **Duration (in hours): 45 min** | | | |  | |
| **Target audience:** Upper-primary and Secondary students | | | | | | |
| **Training methodology:** Online | | | | | | |
| **Level (and cycle, if applicable of the learning experience: /** | | | | | | |
| **Assessment method:** quiz (in Canva) | | **Form of participation in the learning activity:** | | | | |
| **Expected Learning outcomes:**  • Understanding basic principles of innovative learning methodologies  • Understanding the basic principles of PBL  • Understanding the basic principles of the Flipped classroom method | | A student reads the material and participates in answering quiz questions. | | | | |
| **Prerequisites needed to enrol in the learning activities (if needed): none** | | | | | | |
| **Supervision and identity verification during an assessment:** | | | |  | |  |
| • Unsupervised with no identity verification. | | |  |  | |  |
| • Supervised with no identity verification. | | | • | (Identity will be seen if a student logs in Canva with his/her account) | |  |
| • Supervised online or onsite with identity verification. | | | * 3•• |  | |  |
| ***Key Words***  *Innovative learning methodologies, collaboration, teamwork, PBL, flipped classroom* | | | | | | |

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| **Module 1.1** |
| **Understanding New Learning Methodologies** |
| 1.1.1 Overview of new learning methodologies  The educational approach in innovative learning methodologies is based on **direct engagement and practical experience** in the learning process. Most new methodologies **are student-oriented**, meaning that they involve **active participation of students, manipulation of materials, and real-world application of knowledge and skills**.  As opposed to traditional learning methods also known as passive ones, learning through innovative methodologies demands the **involvement of students** in the process. The differences in approaches result in **different skills gained during both pedagogical methods and levels of in-depth connection** formed with the studied subject. When students actively manipulate the studied matter or are actively involved in the research, they gain a **deeper understanding** of the concepts being taught, and they memorize the introduced subject better as opposed to listening to a teacher and taking notes about the subject.  There are many types of learning methods that fall under innovative learning. Lines between them are often blurred and they can interact with each other in the sense that one or more characteristics from one method are also applicable to the other. Innovative learning methods can also be part of traditional methods; chances are, you as a student already know some of them even though not necessarily under the same name.  Some of the most commonly known innovative learning methods are:  **Project-based learning**: Learning that is focused on real-life problems that are being tackled through hands-on projects done by students.  **Game-based learning**: Learning that enhances the appeal of games as part of the learning process to increase engagement and motivation. Games used become educational tools that increase students' motivation, knowledge and skills.  **Gamification**: This method applies game elements (like scores, levels, badges, and leaderboards) to existing learning activities and can be implemented in a non-game context. A game-like atmosphere that is established encourages participation and competition.  **Inquiry-based learning**: Learning that starts with an open-ended question by the teacher or a project assignment that is followed by active engagement of students.  **Collaborative learning**: This term includes any activity where learners work together (like PBL for instance).  **Flipped classroom**: An innovative approach where students get their first exposure to content before coming to class and then spend in-class time engaging in activities in a dynamic, interactive learning environment.  **Blended learning**: a combination of traditional face-to-face classroom methods and online education leveraging technology to enhance learning.  **Experiential learning**: learning through hands-on experiences and reflection.  All mentioned methods have the following in common:    1.1.2 Benefits of new learning methodologies  **The benefits** that students gain from innovative learning methodologies are closely connected with their characteristics:    Because of active, hands-on learning and connection to the real world, these methods are **engaging and effective**, offer **in-depth knowledge**, and give students more **autonomy**. They also encourage the development of **soft skills**, and because of the use of technologies, they offer more **flexible,** **personalised learning,** which leads to **inclusiveness** and improves attitudes towards technology. The use of technology also allows students to learn how to effectively manage **high-tech tools.** Some of the soft skills that could be strengthened during these lessons are creativity, problem-solving, communication, teamwork, adaptability, critical thinking, and collaboration to name just the most important ones.  **Specific benefits of using innovative methodologies and Arduino:**  There is another benefit of using new methods of learning that goes beyond the classroom. Skills and knowledge that students gain from new methods, especially in connection to real-world problems, can be very beneficial for **students' future** and the **various career paths** he or she might pursue. Basic coding skills that students develop during let’s say, PBL with Arduino can inspire them to pursue a **career in coding, electronics, robotics** or something similar. Arduino offers a great opportunity for a more **practical approach** through learning by doing or learning by building. Students learn coding concepts through projects and the process of constructing and programming. This fosters a **deeper understanding of the practical applications of coding**. Coming in contact with real-life problems and finding solutions can be indeed inspiring. There is another great advantage of Arduino, it offers many opportunities for independent exploration and project development outside of school.  1.1.3 Role of a student  In innovative learning methodologies, the active participation of students is expected. Because students are given a bigger or different role, the **teacher-student dynamic** changes as it becomes more **collaborative**. New learning methods encourage collaboration between teachers and students in the development of lessons and projects to leverage student interests and address specific needs. Students become more involved in the process and on the other hand, a teacher goes from being mostly a lecturer to being a mentor or facilitator. Nevertheless, he or she is still there to offer **guidance and support** when needed. Students are encouraged to be more **independent**, to take control over studying and to find solutions/results by themselves.  Most innovative methods are constructed with this changed role of a student in mind. Engaging methodologies like project-based learning, gamification, collaborative activities, and other student-centred approaches are essential for student motivation and effective learning.  Among other things, students are encouraged to develop **collaboration, communication**, and **presentation skills** through group projects and peer reviews.  Here are some tips on:  **Collaboration**  Most methodologies that we mentioned are based on collaboration and at least some group work is expected in most activities. Consequently, for a method to be successful **students must learn how to effectively work on projects and collaborate with peers.**  Active engagement of every student is something that can be challenging to achieve especially if students are used to passive involvement in the classroom. Some of the holdbacks for not participating in the classroom can be: **insecurity** (student doesn’t feel comfortable and is afraid to participate), **confusion** (student doesn’t know what he/she is supposed to do), or **bad group dynamics** (conflict in the group). Teachers should pay attention and try to deal with the mentioned setbacks but there are also many ways you, as a student, can help avoid or mitigate them.  Firstly, you can contribute to **a positive classroom culture**. A supportive and safe space to express is essential for the success of group work. You can achieve this by **active and empathetic listening**, treating others with **respect** and **appreciating each other's perspectives**.  It is also important to consider that groups function well when they can build on one another’s strengths so that each member is adding their own expertise to the project. In this regard, you as a student that is part of the group can actively look for ways to find the **hidden strengths of your team members** within the project.  Additionally, collaboration (and effective communication) is an **essential skill needed in today's world**, it is useful in every aspect of life, including your future career path. Being able to practice and strengthen this skill in the classroom is an opportunity you should seize.  **Peer assessment** (also peer review or peer feedback)  This activity refers to the process of students **providing feedback to their classmates** on their learning activities (projects, presentations, etc.). Assessment is something that is traditionally done by teachers but because active participation of students is at the centre of most innovative learning methodologies, students are often encouraged to be involved in this activity.  Allowing students to asses “helps students identify **strengths and weaknesses in their own** work by observing and analysing the work of others. It also provides an opportunity for students to learn **different perspectives and approaches**.” (Sanako blog, 2024)  This activity is **beneficial for both parties**; the one that is assessing gets familiar with assessing strategies and can reflect on his/her own individual performance and the one that is being assessed is receiving feedback and insight on his/her performance.  Peer assessment gives students more **responsibility** as they must assess others and also it allows them to become more responsible for their own progress.  Communication is again one of the key skills in this activity: students must **learn to express their thoughts** and **justify their opinions**. Peer assessment is not necessarily one-way communication and in that aspect it is important to stay respectful and actively listen to others. Usually, a teacher gives students guidelines on what to assess that student can follow. To sum up, when assessing others keep in mind to be **constructive, respectful and able to justify your assessments.** |

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| **Module 1.2** |
| **Project-Based Learning (PBL) Fundamentals** |
| 1.2.1 The principles of PBL  PBL **is a student-centred learning method that is based on projects.** PBL is an inquiry-based and problem-solving methodology in which students are engaged in solving real-world related problems. It is one of the methods that is based on the principle of **learning-by-doing or learning-by-building**; students are **actively engaged** throughout the whole process, especially through the implementation phase.  As with all problem-based courses, PBL also **starts with exposing problems** rather than with an exposition of disciplinary knowledge. Students move towards the acquisition of **knowledge and skills** through a staged sequence of problems presented in context, together with associated learning materials and support from teachers. The **interconnection of knowledge and skill** that takes place during PBL is very beneficial because it allows **better knowledge retention** and because of the meaningful and original solutions relevant to the real world, **motivation** in students is increased.  In PBL, the students are collaboratively engaged in planning, problem-solving, and researching over extended periods, preferably from one week to even the whole semester.  To sum up, PBL is highly beneficial for students, including those with special educational needs, for several key reasons:  • **Active learning**: students learn by doing (researching, making projects, actively participating in the process)  • **21st-century skills** are being developed, including the so-called 4 C’s: critical thinking, creativity (they are encouraged to find solutions), collaboration (they develop collaboration skills by working in a group) and communication (they learn how to present the final product, and strengthen their communication skills in a group). Decision-making, planning, and responsibility are also some of the skills that are being tackled.  • Enhance **technical skills**: specifically, in the case of Arduino, students learn the concepts of coding.  • **Motivation** towards learning and autonomy.  • **Connection to real life**, thus making the results more relevant.  • Encourages **diverse learning**: learners can learn at their own pace and with the material they like best.  1.2.2 Structure of PBL and the role of a student  PBL lesson plan usually consists of 5 phases:    Because PBL is a student-centred method, active participation from students is expected in all phases, to at least some degree.   1. **Project planning**: This is the phase where the teacher defines the project’s **main theme**, creates a **driving question** that students will explore throughout the project and **sets goals** that need to be achieved by students. It is also the phase where the teacher plans how much time will go to frontal lectures and how much to activities. This is the place where **ideas from students** can come into the picture; the teacher can ask students about **some of the activities** they are interested in and include them in lesson plans. A teacher might start by asking questions or addressing a problem related to students' everyday life, their environment, or their school community. Of all the phases this first one predicts the least involvement of students. 2. **Research and idea development:** This phase is mostly done by students, with the teacher offering support and guidance. Students are expected to do **the research** by using **various sources of information** to get as diverse a range of data as possible. In this phase, teachers guide students to get to the best sources, keeping in mind the main characteristics of these sources - **quality and credibility**. Sources can be of different kinds: from **online sources** to **physical literature**, from **talking to experts** to **visiting museums** and many more, depending on the main theme.   At the end of this activity teacher collects data from all students.   1. **Implementation:** Thefocus of this phase is on the execution of project activities. This is probably the most exciting phase because **students get to carry out the activities** they were planning in the previous phases. This involves creating **prototypes, videos, performances**, **installations, posters** etc. The role of a teacher remains in the back, as they offer guidance and support when needed. Students should not hesitate to reach out to the teacher if/when encountering a challenge. The teacher organises the material and assigns roles in a group if needed but all the work is performed by the students. This is the phase where students can unleash their **creativity and innovativeness**. 2. **Presentation of results:** this is the phase where students **present** the project’s results, and **discuss** what they learned, this is also time to **reflect** on the process. Presentation of the project can be done in many forms like **posters, prototypes, videos, animations, art installations, and digital storytelling** to name a few. Teacher(s) and peers should give **feedback** on the presentation.   The main activity of this phase is again performed by students as they are the ones doing the presentation. They can also get involved in reaching out to the potential audience for the presentation which might have interest in project results (for instance, they can reach out to local companies that might use a product that was developed during the lesson).   1. **Evaluation:** in this last phase, teachers are expected to **assess, analyse and reflect** on students’ achievements as well as on the project itself. The assessment should be multilayered and incorporate an assessment of **content, skills, and student engagement**. One of the activities that is most likely taking place in this phase is **gathering feedbacks about the whole lesson from students**. Students can also get involved in this phase if teachers ask them to **develop assessment criteria together** or just by letting the students know what the assessment criteria are (by sharing a checklist with them for instance). The level of involvement of students depends on how old the students are and if they already have some experience in PBL. Getting more involved with evaluation helps students **reflect more deeply on the steps of the project and what quality work looks like.** |

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| **Module 1.3** |
| **Flipped Classroom Approach** |
| 1.3.1 Principles of a Flipped Classroom  The flipped classroom model takes a spin on traditional teaching methods and their concept of introducing the subject in the classroom first and then studying it at home. Flipped classroom is an innovative method that goes especially well with the rise of new technology and it probably wouldn’t even be possible without it. Adjective flipped refers to a **reverse sequence of events**: students are first given the material to **study the subject on their own** and are then invited to discuss and resolve questions **in the classroom through different activities** (in traditional learning scenarios this would be called homework). Because they already gained some knowledge about a specific subject before the class, class time can be utilised for achieving a **higher order of thinking** and **skills development**.    This process allows students to have an active role in the process and gives them more autonomy. Students are provided with **topics**, **objectives** and **materials** by the teacher. One of the main appeals of this approach is that it allows students to engage with content that needs to be studied at **their own pace**.  Because of the reverse situation in a flipped classroom, students do not display the ability to **recall and memorise** but rather to **understand and create.** (Flipped Classroom in Practice, 2018)  The role of a teacher in a flipped classroom has changed as it is no longer so much that of a lecturer but more of a **guide or a mentor**. A teacher has more time and opportunities to address the needs of each student individually and the different levels of knowledge they possess or the different challenges they face. Students can benefit from this method because a teacher has more time and opportunity to adapt to **individual student learning needs**, making this method more inclusive.  **Main advantages for students**: Increased engagement and motivation, better understanding and retention of knowledge, meaningful learning, and increased learning autonomy.  **Challenges**: For this method to work the way it was meant to, students must do their part at home. They must have **access to the material** (internet and computer access) as well and they have to have the **motivation**. (B. Petty, 2018) There is **no direct supervision** in the first part for students and they have to have some **time-management skills and self-discipline.**  Here is an animation video about a flipped classroom from the perspective of a student (concept of FC, advantages, disadvantages, useful tips): <https://www.youtube.com/watch?v=avvsxquMH0g> (Simpson, 2019)  1.3.2 Flipped classroom and the role of a student  As was stated before, students hold the key to a successful flipped classroom (FC) lesson outcome. For FC to succeed the **preparation phase done by students is crucial**. The teacher gives students the material in different forms (videos, books, online sources etc.) and students must go over everything the teacher prepares for them. The good thing is that students can do this in the **comfort of their homes** and within the **timeframe they choose**. Students can go over the same materials as many times as they like or need. While going over the material is good to **keep in mind the learning objectives** set by the teacher. When students come to class they are expected to be prepared.  This preparation phase requires a certain level of **commitment, responsibility** and **self-discipline** from students. It also helps strengthen students' **time management skills**.  A useful tip for students: **eliminate distractions when studying at home**. If you have trouble staying off your phone and are easily distracted by it, put it away for the time you choose to study. If you are using the computer to study the material, stay off social media and other distracting platforms that are not connected to the studying.  However, going over the material does not mean that students have to understand everything on their own – it is perfectly OK if students have difficulties with some of the material. It is expected that **the harder parts** and **more complex concepts** will need to be explained by the teacher in class. And that brings us to the next tip for students: **take notes while studying**. **Write down questions** for a teacher and let her/him know what you had trouble understanding. Going over the material and grasping the easier concepts on your own allows the teacher more time to go over the more complex concepts which leads to the higher order of thinking.  Once the material is studied students come to class to engage in practical activities and apply their knowledge to relevant projects. It is expected that students be **active in the classroom**: **ask questions, be creative**, and **don’t be afraid of making mistakes** as they are an unavoidable part of learning.    A flipped classroom can be a very rewarding method that can lead to deeper knowledge and better knowledge retention because it is **not based on memorisation but on application**. All this can also lead to better grades. However, for it to be successful, students must play their part and do their share of work.  **Assessment for Section 1**  By clicking on the following link you can test your knowledge of Section 1 content, regarding Module 1.1 **Understanding New Learning Methodologies**, Module 1.2 **Project-Based Learning (PBL) Fundamentals** and Module 1.3 **Flipped Classroom Approach**.  There are 9 questions, 3 per module: <https://www.canva.com/design/DAGePCJqdfo/LWk1JlcSeXfE3jdd0A0oXw/view?utm_content=DAGePCJqdfo&utm_campaign=designshare&utm_medium=link2&utm_source=uniquelinks&utlId=hf769cec115>  Bibliography:  *Flipped Classroom in Practice. Innovating Vocational Education* (2018). Erasmus+ Project. <https://ec.europa.eu/programmes/erasmus-plus/project-result-content/17061004-3280-44bc-81ca-463b3f329b5d/Flipped%20Classrom%20in%20Practice%20EN.pdf>  Sanako Blog (22. 1. 2024). *Peer-to-peer feedback – unlock the hidden power of your students.* Sanako.com<https://sanako.com/peer-to-peer-feedback-unlock-the-hidden-power-of-your-students>  Simpson, K. (2019). *Student Guide to flipped classroom* [Video]. YouTube. <https://www.youtube.com/watch?v=avvsxquMH0g>  Petty, B. (23.7.2018). *4 Tools for a Flipped Classroom*. Edutopia.org. <https://www.edutopia.org/article/4-tools-flipped-classroom/> |

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