# PROJECT-BASED LEARNING

## 1. What is Project-Based Learning?

According to Edutopia, Project-based learning (PrBL) is the ongoing act of learning about different subjects simultaneously. This is achieved by guiding students to identify, through research, a real-world problem (local to global) developing its solution using evidence to support the claim, and presenting the solution through a multimedia approach based in a set of 21st-century tools.

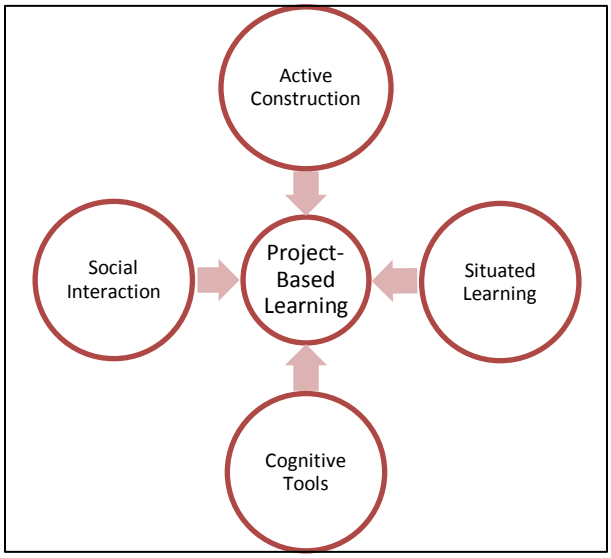
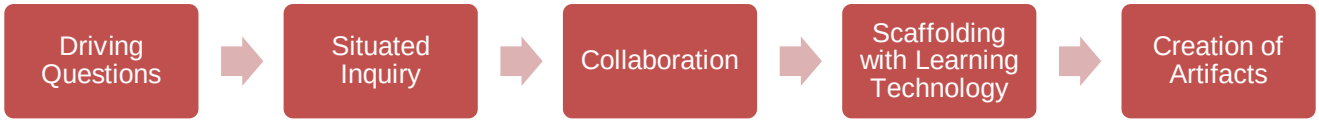



Figure above shown four major learning sciences ideas on PrBL

## 2. Why Project-Based Learning?

Project-based learning allows students to learn by doing and applying ideas. Students engage in real world activities that are similar to the activities that adult professionals engage in research. In such, PrBL enables students to investigate questions, propose hypotheses and explanations, discuss their ideas, challenge the ideas of others, and try out new ideas.

## 3. Structure of PrBL




Step 1 Step 2 Step 3 Step 4 Step 5

## 4. The Roles

| Step | Description | Roles of Teacher | Roles of Students |
|---|---|---|---|
| 1 Driving Questions | The driving question that guides instructions and learners find meaningful learning. Driving questions serves to organize and drive activities of the project, provides a context in which students can use and explore learning goals and scientific practices. | • Develop and selecting driving question.<br>• Help students see the value of driving questions.<br>• Provide common experiences that help learners to relate new ideas to explore in the projects.<br>• Ensuring driving questions meet learning goals. | • Pursue solution to the driving questions.<br>• Develop meaningful understandings of key scientific concepts, principles and practices.<br>• Relate driving questions to drive new ideas. |
| 2 Situated Inquiry | Students explore the driving question using new ideas that they're learning, and they investigate the driving question over a sustained period of time. | • Help learners design an investigation based on the driving questions.<br>• Model an investigation while asking students to provide suggestion.<br>• Provide feedback to learners as conduct they conduct their own investigation.<br>• Support and help students to create explanation and conclusions. | • Conduct and design a new investigation by modifying the procedure of investigation demonstrated by teacher.<br>• Self-evaluate as well as provide feedback to peers post investigation on whether the modified procedure is feasible and appropriate. |

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| 3<br>Collaboration | Students collaborate with others in their classroom and with their teacher to ask questions, write explanations, form conclusions, make sense of information, discuss data, and present findings. | • Help students develop skills in collaborating, including turn-taking, listening, and respecting others' opinion. | • Discuss ad compare ideas with peers.<br>• Provide feedback to peers. |
| 4<br>The Use of Learning Technology | Integrate the use of technology tools into the learning process to help learners actively construct knowledge and help teachers to foster enquiry. | • Provide accessibility of technology tools for students.<br>• Encourage and guide students on the use of technology tool. | • Use learning technologies to access real data, to collaborate with others via network, to gather data, to graph and analyze data, to create model, and produce multimedia artifacts. |
| 5<br>Creation of Artifacts | Learners learn more effectively when they develop artifacts – external representations of their constructed knowledge. However, artifacts need to address the driving question, show the emerging understanding of learners, and support learners in developing understanding associated with the learning goals of the project. | • Provide an extensive feedback to learners. | • Develop physical models and computer models, reports, videotapes, drawings, games, plays, websites, and computer programs- to represent and explain their ideas and understanding. |

## 5. Instructional Materials

| Traditional Instructions | Project Based Learning |
|---|---|
| • Texts, lectures and presentations | • Direct and original sources: Driving Questions, printed materials, interview, documents, and others. |
| • Teacher developed exercise sheets and activities. | • Data and materials developed by learners. |

## 7. References


- Bell, S. (39-43). Project-Based Learning for the 21st Century: Skills for the Future. The Clearing House, 2010.
- Krajcik , J., & Blumenfeld, P. (2006). Project-Based Learning. In R. Sawyer, The Cambridge Handbook of the Learning Sciences (pp. 317-333). Cambridge University Press.
- Yoong , C. (2014). Student Engagement and Learning using an Integrated Student-Lecturer Engagement Design Framework. IEEE International Conference on Teaching Assessment and Learning for Engineering.


## 6. Assessment

| Assessment | Outcome | Tools | Assessed By |
|---|---|---|---|
| **Formative** | ❖ **Assessing Learning Performance**<br>Assess for higher level of cognitive outcomes such as asking questions, designing investigation, gathering and interpreting data, and creating scientific explanations | Rubrics, Observation, Concept maps, Project proposal | Teachers / Peers / Community |
| | ❖ **Student Motivation Assessment**<br>Record learners activeness and attitude | Video Records, Observation | Teachers / Peers |
| **Summative** | ❖ **Assessing Artefacts**<br>Assess quality of student performance in accomplishing in project tasks | Posters, Artefacts, Rubrics, Portfolio | Teacher's / Learner's |
| | ❖ **Student Performance on Curriculum**<br>Pre and Post Test | Examination, Test, Quiz | Teacher's |


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