Open Source Software to Promote Effective Learning in Primary Schools

Impact on student-centered learning in Mongolia

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Background

Transition from Centrally-Planned Economy to Market Economy (1991)

- Decentralization and democratization
- Transition of market economy
- Decreasing the national budget

Issues of the education sector

(1) Decrease in the educational budget
(2) Decrease in the literacy rate
(3) Urban migration of rural teachers
(4) Inadequate infrastructure

Policies related to education

- New Educational Standard (2005)
- Education Master Plan (2006-2015)
- Information and Communication Technology in Education Policy (2012-2016)
Background
Student-centered approach and ICT in education

New Education Standard (2005)
• Increase the schooling year from 10 years to 12 years,
  Promote the use of student-Centered Approach

• Improve the training system for teacher with the use of ICT and distance learning,
  Increase the number of PCs in each school, Supply every teacher with a laptop, Connect the schools to the internet

Mongolian government focuses on both student-centered approach and ICT!!
Primary school teachers indicated that
- Scratch has a positive impression on its usefulness and applicability
- Scratch was used as a tool to enhance students’ motivation and interest

Scratch has the potential to promote student-centered approach
Outline of Scratch (1)

- Programming software for kids above 8
  - Young students can learn the concept of programming easily

- MIT Media Lab - developed by **Lifelong** Kindergarten Group-
  - “develop new technologies that, in the spirit of the blocks and fingerpaint of kindergarten, expand the range of what people can design, create, and learn”
  - Promotes mathematical thinking, computational thinking, creativity, systematic reasoning, and collaboration.

- Characteristics
  - Can use Mongolian Language
  - Many ready-made material is contained
  - Teacher can use their own material
  - User-friendly
Outline of Scratch (2)

**Features**

- FOSS
- Mongolian language can be used
- Including many ready-made material such as illustration, picture, sound
- Scratch can use original material which is created by user
- Easy to use

Combine the blocks to control the character, change the background image etc. to create multimedia contents.
Methodology

**i**
To identify the understanding of “Student-Centered Approach” within the context of Mongolian primary schools teachers

**1-1.** Questionnaire / Focus group discussion (Khouvsgol, UB)
1) To clarify the key-factor of student-centered approach

**1-2.** Focus group discussion

**ii**
To analyze the current usage of Scratch

**iii**
To analyze the effect of lessons using Scratch for classroom teaching with case studies

**Questionnaire (3 provinces)**
2) To illustrate the current usage of Scratch at school level and to see the impact on students

To analyze how lessons using Scratch contributes to promote a student-centered approach in primary schools in Mongolia
Analysis

1. Student-centered approach
2. Scratch use and impact in primary schools
3. Review of lessons that uses Scratch
Survey on Student-Centered Approach

Interpretation of student-centered approach

1. Enhancing students’ creativity and problem solving ability
2. Promoting teachers’ activity to encourage students’ motivation and interest
3. Creating supportive learning environment

Objective: To clarify the important factors of student-centered approach in Mongolian context (rating 15 potential factors)
Survey on Scratch Use in Primary Schools

Scratch training conducted in 3 provinces in Fall 2011
Questionnaire distributed at Scratch teaching material competition held in Winter 2011
Teachers’ View on Scratch

- **Easy to use**: 56% Yes, very much, 23% Yes, 14% No, 6% Not at all, 1% No answer

- **Interest**: 70% Yes, very much, 25% Yes, 5% No, 5% Not at all

- **Usefulness**: 85% Yes, very much, 10% Yes, 5% No, 10% Not at all

- **Applicability**: 77% Yes, very much, 15% Yes, 8% No, 8% Not at all, 8% No answer

(N=79)
Teachers’ Willingness to Use Scratch

For creating teaching material
- Yes: 94%
- No: 6%
- No answer: 0%

For participating in Scratch training
- Yes: 96%
- No: 4%
- No answer: 0%

For improving skill of using Scratch
- Yes: 97%
- No: 3%
- No answer: 0%

Teachers are willing to use Scratch and to improve their skills.
For which subject Scratch material is developed?

- Physical Education: 1
- Music: 4
- Art & Technology: 13
- Human & Society: 10
- Human & Environment: 34
- Math: 17
- Mongolian Language: 28
- Others: 0

(N=79)
Scratch and Subjects (2)

Which subject is useful for Scratch?

- Physical Education
- Music
- Art & Technology
- Human & Society
- Human & Environment
- Math
- Mongolian Language
- Others

(N=92)
Pre-installed media in Scratch were helpful for material production even without Internet.
Purpose of Using Scratch for Classroom Teaching

- Use of story to encourage discussion among students
- Advantage of using music and illustration

N=79 (multiple answers)
Impact on Students: Teachers’ Perception

- Students enjoyed the lessons using Scratch
- Students understood faster
- Students understood the lesson slower than before
- Students lost concentration
- Students became bored
- Others
- No answer

N=88
(multiple answers)
Teachers’ Attitude on Material Sharing

Sharing Scratch materials in their school

- Yes: 63%
- No: 37%

N=75

Way of Sharing

- Organize training
- Share material
- Already known
- Others
- No answer

[Others]
- Made new plan for lessons
- Shared/copied manual with/to others
- Showed CDs to teachers

Production of scratch promoted team work among teachers.
# Model Lessons Assessment

![Map of Bayankhongor](image)

<table>
<thead>
<tr>
<th>Lesson 1</th>
<th>Lesson 2</th>
<th>Lesson 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jargalant district school</td>
<td>Nomun-dalai school</td>
<td>Nomun-dalai school</td>
</tr>
<tr>
<td><strong>Subject/Grade</strong></td>
<td><strong>Human &amp; Environment / 4&lt;sup&gt;th&lt;/sup&gt;</strong></td>
<td><strong>Mongolian Language / 5&lt;sup&gt;th&lt;/sup&gt;</strong></td>
</tr>
<tr>
<td><strong>Topic</strong></td>
<td>My hometown</td>
<td>Protect the water</td>
</tr>
<tr>
<td><strong>Number of participants</strong></td>
<td>15</td>
<td>7</td>
</tr>
</tbody>
</table>

Sep. 2012
Assessment Results

1. prepare lesson plans for a class...
2. develop your own teaching materials...
3. provide your student with...
4. organize students' small group...
5. organize experiments and/or...
6. take your students out of the...
7. use picture and charts in the class
8. give homework
9. provide every students with...
10. encourage your students to ask...
11. encourage your students go find out...
12. (For other subjects) provide...
13. provide opportunity to predict the...
14. let the students think "Why" if they...
15. let students think "the other ways"...
16. let students relate the new...
17. relate the lesson with the various events/phenomenon occurred/found in the daily lives

Develop your own teaching materials and aids
Use picture and charts in the class
Relate the lesson with the various events/phenomenon occurred/found in the daily lives
Findings

1. **Useful, easy, and Interesting program**: Majority of the respondents have a positive impression of Scratch with its usefulness.

2. **Potential Effective teaching tools**: Scratch is considered as an effective teaching tool. More than 90% of respondents are interested in further improvement of their Scratch skill and training.

3. **Useful tool to reflect localized materials**: New Education Standard requires 20% of curriculum to include local information and environment.

4. **Advantage of installed materials**: “Scratch Media” was well utilized by teachers for creating teaching materials. Thus, Scratch has advantage where there is no Internet infrastructure.

5. **Encourage student’ participation**: Scratch is used with the purpose of encouraging student discussion and group work.

6. **School-based training**: Scratch is widely used at school-based training. Teachers are willing to share produced materials, improving quality of teaching materials.

7. **Original objective of Scratch**: Expected attitudes, e.g. creativity, systematic reasoning, and collaboration, found among teachers through using Scratch for creating teaching materials. (= lifelong learning)
The End
Thank you
Lesson components and use of Scratch

- Lesson has 8 components.
- Methodologist suggested to use Scratch on introduction or motivation components.
- However, teacher indicated that Scratch can be used on all components.