STEAM Education in Early Years

Syllabus

Lecturer: Ching-Ting Hsin/ Associate Professor Email:cthsin@mx.nthu.edu.tw

Time: Wednesday 567 (13:20-16:20)

Classroom: 1405, Nanda Campus

Class description

The purposes of this class are to help students to understand inquiry-based STEM activities and projects for young children and the ways to improve and assess young children's inquiry ability. Three approaches are introduced: (1) theme-based STEM activities, (2) project-centered STEM curriculum, and (3) project approach to STEM curriculum. This class also involves the discussion of culturally integrated STEM curriculum. Students will use their knowledge and skills that they learn in this class to hold a STEM camp and develop STEM projects.

week	Date	Topic	Reading/assignments
1	9/12	Introduction and grouping	
2	9/19	Introduction to STEM Education Inquiry cycle and assessment Standers of cognitive domain in Taiwan	Moomaw C1 handouts
3	9/26	STEM activities for learning centers/camps	Moomaw C2 video clips
4	10/3	Haus der Kleinen Forscher (Little Scientists' House) Program- the theme of technology: forces and effects	handouts
5	10/10	National Day	
6	10/17	Visit Little Scientists' House Foundation (no class)	
7	10/24	Haus der Kleinen Forscher (Little Scientists' House) Program: the theme of water	handouts
8	10/31	STEM in a project-centered curriculum: ice, tree, catapults, floating banners, cars The importance of questions	Moomaw C5 handouts
9	11/7	Design and prepare for a STEM camp for kindergartners: Lesson plans	handouts

10	11/14	(university sports day, make up the 10/17 class) Design and prepare for a STEM camp for kindergartners: preparation for teaching materials	Turn in lesson plans
11	11/21	Holding a STEM camp for kindergarteners	
12	11/28	Expert talk: educational computer games	Turn in reflection reports for the camp
13	12/5	Project approach to STEAM curriculum Examples of projects	Helm & Katz, C1 C9
14	12/12	Culturally integrated STEAM projects Indigenous funds of knowledge Indigenous STEAM projects	Moll et. al, 1992 Video clips Turn in reflection reports for the talk
15	12/19	Culturally integrated STEAM projects Giwas love science Development of STEAM projects	Video clips
16	12/26	Development of STEAM projects	handouts
17	1/2	Share and demonstrate STEAM projects	
18	1/9	Review of the class	Turn in the STEAM project

Teaching methods

Lectures, small group discussion, classroom activities, holding a STEM camp in a kindergarten, presentations of STEAM projects

Assignments and evaluation

1. Activities/lesson plans for a STEM camp (20%)
   Individual work, 1-2 pages, single space, due 11/14
2. Self-reflection and evaluation of the STEM camp (20%)
   Individual work, 1 page, single space, due 11/28
3. Reflection of the talk (10%)
   Individual work, 1 page, single space, due 12/12
4. The web of concepts and activities of the STEAM project (30%)
   Group work, 4-5 pages, single space, due 1/9
5. Attendance and classroom activities (20%)

Readings

1. Haus der Kleinen Forscher (Little Scientists' House) Program
2. Helm, J. H., & Katz, L. G. (2016). Young investigators: The project approach in the early years (3rd ed.). New York: Teachers College, Columbia University.
3. Moll, L. C., Amanti, C., Neff, D., & Gonzalez, N. (1992). Funds of knowledge for teaching: Using a qualitative approach to connect home and classrooms. Theory into Practice, 31(2), 132-141.
4. Moll, L. C., Soto-Santiago, S. L., & Schwartz, L. (2013). Funds of knowledge in changing communities. In K. Hall, T. Cremin, B. Comber, & L. C. Moll (Eds.), International Handbook of Research on Children's Literacy, Learning and Culture (pp. 172-183). Chichester, UK: Wiley-Blackwell.
5. Moomaw, S. (2013). Teaching STEM in the early years: Activities for integrating science, technology, engineering, and mathematics. St. Paul, MN: Redleaf Press.
6. ppt and handouts