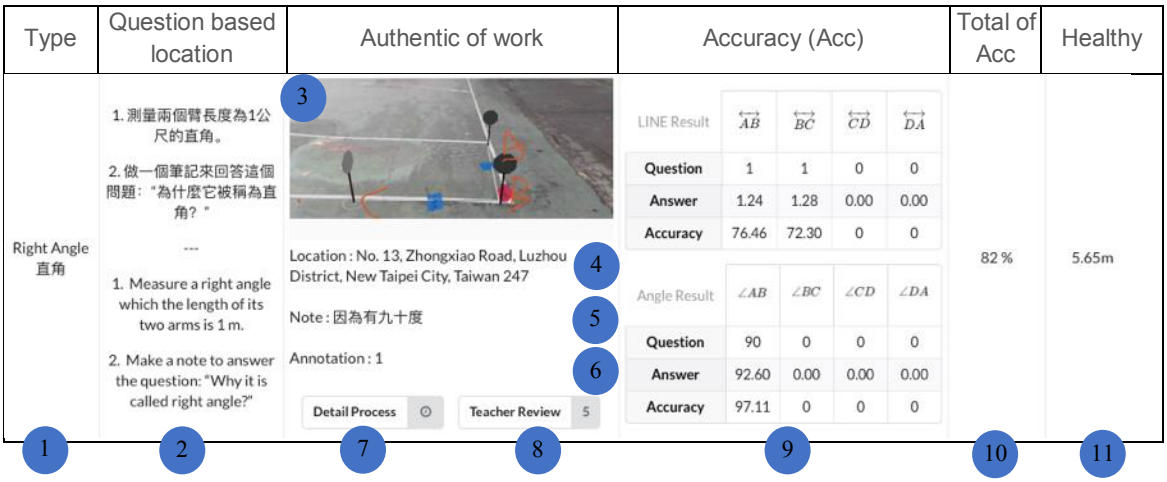
Appendix

Appendix 1. Example of students' authentic of work on Dashboard-UG



There is some information on the Dashboard-UG, such as:

1. Types of sub-topics were chosen
2. Types of geometry problem-solving questions that appear based on location
3. Students' authentic work in the picture
4. The location of the geometry object
5. Explanation of student work results
6. The number of annotations that have been made by students
7. Detail the process of student work to solve problem-solving
8. Form for teacher assessment
9. Quality of measurement accuracy compared to the question
10. Total quality of measurement
11. The distance needed by students to complete problem-solving on authentic

Appendix 2. Example of students' authentic of work on Authentic-UG

There is some information on the Dashboard-UG, such as:

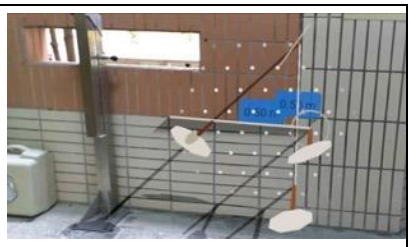
1. Authentic learning results that have been displayed with the picture
2. Authentic learning results that have been displayed with the video process
3. Details of authentic results of work
4. Total peer assessment from other students
5. Detail peer assessment from other students

Appendix 3. Example of authentic of work each learning material on school environment

Line Topic

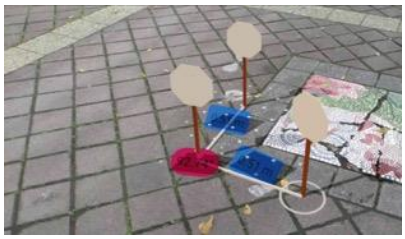
single line

parallel line

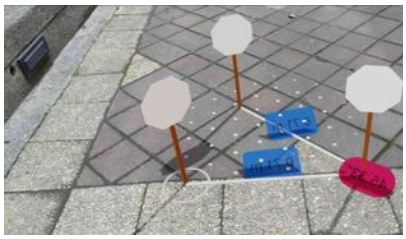


perpendicular line

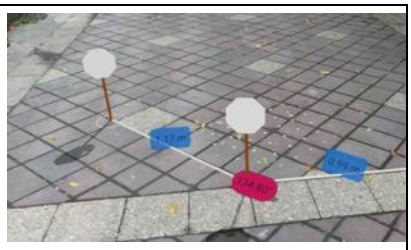
Angle Topic



right angle



acute angle



obtuse angle

Combine Topic

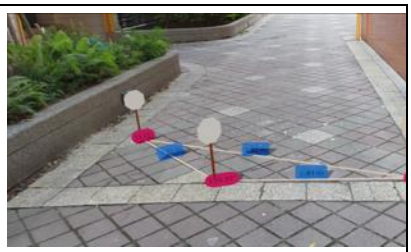
complementary (90 degree)

supplementary (180 degree)

Triangle Topic

right triangle

acute triangle



obtuse triangle

Quadrilateral Topic

square

rectangle

Appendix 4. The pre-test questions

PRETEST

的名字 Name :

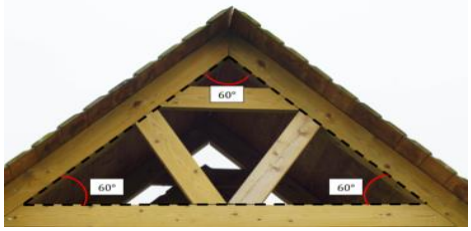
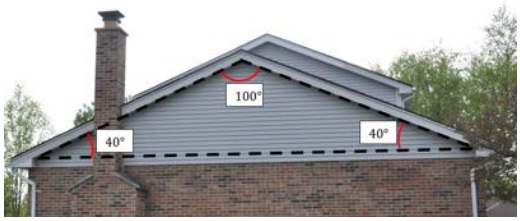
身份證號碼 ID Number :

A. Recognize shape and figures

Classify the angles as acute angle, obtuse angle, or right angle.

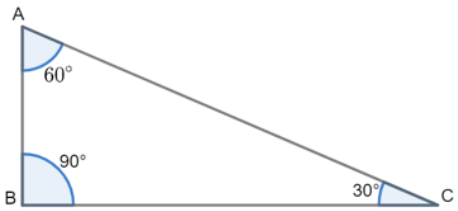
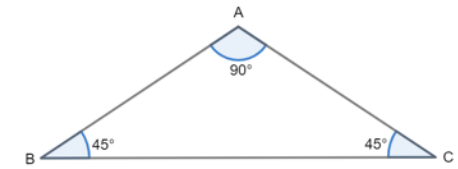
1.		A. 銳角 acute angle B. 鈍角 obtuse angle C. 直角 right angle
2.		A. 銳角 acute angle B. 鈍角 obtuse angle C. 直角 right angle
3.		A. 銳角 acute angle B. 鈍角 obtuse angle C. 直角 right angle

三角形的分類。Classify the triangles .

4.		A. acute triangle B. obtuse triangle C. right triangle
5.		A. 銳角三角形 acute triangle B. 鈍角三角形 obtuse triangle C. 直角三角形 right triangle

6.		A. 銳角三角形 acute triangle B. 鈍角三角形 obtuse triangle C. 直角三角形 right triangle

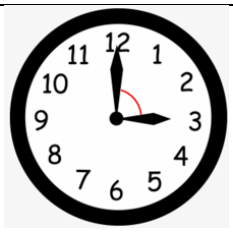
B. Make and measure shapes

Example: Draw two different right angle. 例子: 畫兩個不同的直角。	 

1.	Draw two different *obtuse angles.* 畫兩個不同的鈍角。	
2.	Draw two different *acute triangles.* 畫兩個不同的銳角三角形。	
3.	Draw two different *squares.* 畫兩個不同的正方形。	
4.	Draw two different *rectangles.* 畫兩個不同的矩形。	

C. Estimation

估計圖片中角度的大小。Estimate the size of angles in the pictures.

1.		A. 170° B. 120° C. 100°
2.		A. 60° B. 45° C. 15°
3.		A. 60° B. 90° C. 120°
4.		A. 180° B. 100° C. 150°
5.		A. 170° B. 120° C. 100°

D. Identify shape's properties

例子: 下列哪個陳述是正確的?

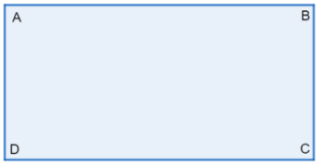
Example: Which of these statements are true?

A. 小於直角的角稱為銳角。
Angles that are smaller than the right angle are called acute angles.

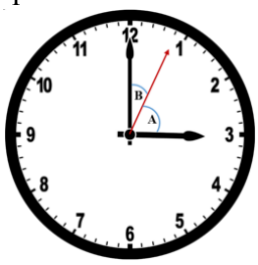
B. 小於直角的角稱為鈍角。
Angles that are smaller than the right angle are called obtuse angles.

C. 一個銳角是一個角等於 90°。
An acute angle is an angle which is equal to 90°.

1. 下列哪個陳述是正確的? Which of these statements are true?
   A. A triangle which has a right angle is called a right triangle.
   B. A triangle which has two acute angles is called an acute triangle.
   C. A triangle which has two obtuse angles is called an obtuse triangle.
2. 下列哪個陳述是正確的? Which of these statements are true?
   A. 正方形有四個直角，四條邊的長度是不相等的。
      A square has four right angles and the size of its four sides is not equal.
   B. 矩形有四個直角，且對邊不平行。
      A rectangle has four right angles and its opposite sides are not parallel.
   C. 矩形是四邊的平面形狀，每個角都是直角。
      A rectangle is a four-sided flat shape where every angle is a right angle.
3. 下列哪個陳述是正確的? Which of these statements are true?
   A. 一個三角形的內角之和是 90°。
      Sum of the interior angles in a triangle is 90°.
   B. 一個三角形的內角之和是180°。
      Sum of the interior angles in a triangle is 180°.
   C. 一個三角形的內角之和是270°.。
      Sum of the interior angles in a triangle is 270°.
4. 研究這些數字，然後回答下面的問題。Study these figures then answer the question which follows.



   下列哪個陳述是正確的? Which of these statements are true?
   A. $\angle A + \angle B + \angle C + \angle D = 180°$.
   B. $\angle A + \angle B + \angle C + \angle D = 270°$.
   C. $\angle A + \angle B + \angle C + \angle D = 360°$.
5. 研究這些數字，然後回答下面的問題。Study these figures then answer the question which follows.



   下列哪個陳述是正確的? Which of these statements are true?
   A. $\angle A$ 和 $\angle B$是互補的角度。$\angle A$ and $\angle B$ are complementary angles.
   B. $\angle A$ 和 $\angle B$ 是補充角度。 $\angle A$ and $\angle B$ are supplementary angles.
   C. $\angle A$ 和 $\angle B$ 是輔助角度，因為它們相加達 90°。 $\angle A$ and $\angle B$ are supplementary angles because they add up to 90°.

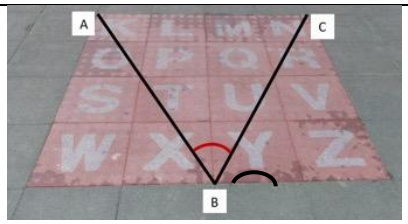
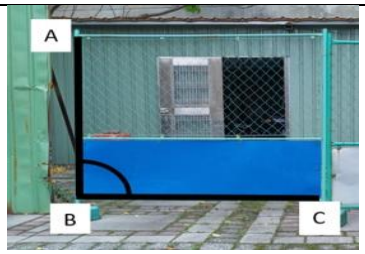
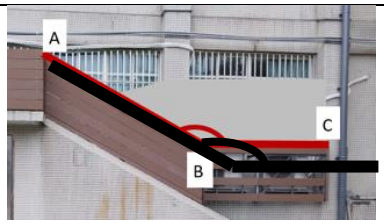
Appendix 5. The post-test questions

POSTEST

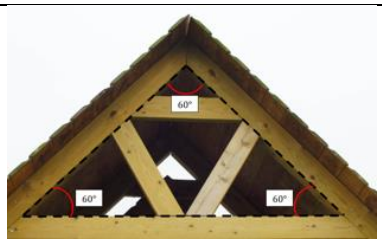
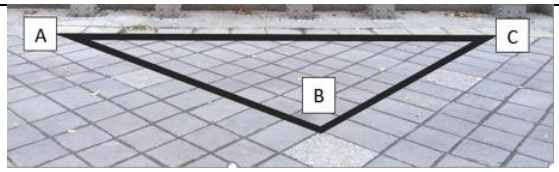
姓名:

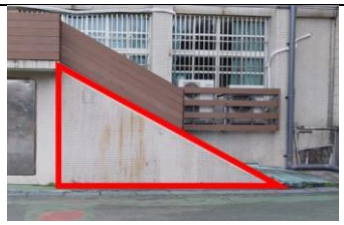
座號:

A. 認識形狀與角度 ，把角分為銳角、鈍角和直角。

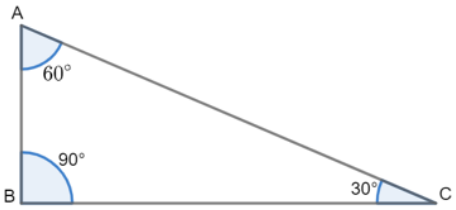
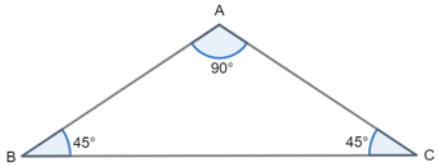
1.		A. 銳角 B. 鈍角 C. 直角
2.		A. 銳角 B. 鈍角 C. 直角
3.		A. 銳角 B. 鈍角 C. 直角

選擇三角形的分類。Classify the triangles .

4.		A. 銳角三角形 B. 鈍角三角形 C. 直角三角形
5.		A. 銳角三角形 B. 鈍角三角形 C. 直角三角形

6.		A. 銳角三角形 B. 鈍角三角形 C. 直角三角形

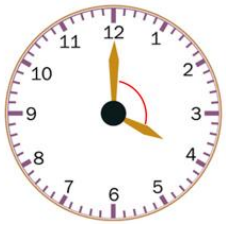
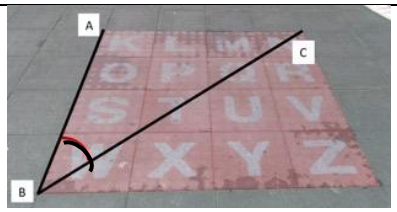
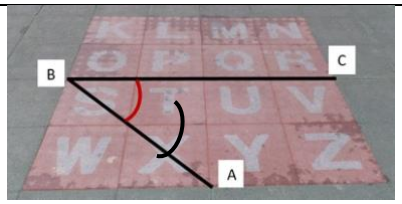
B. 製作不同種類的三角形並標示角度

例子: *畫兩個不同的直角。*	***例子(回答):***  

1.	畫兩個不同的鈍角，並標示形狀。	
2.	畫兩個不同的銳角三角形，並標示形狀。	
3.	畫兩個不同的正方形，並標示形狀。	
4.	畫兩個不同的矩形，並標示形狀。	

C. 估算能力

估計圖片中角度的大小。

1.		A. 170° B. 120° C. 100°
2.		A. 60° B. 45° C. 15°
3.		A. 60° B. 90° C. 120°
4.		A. 180° B. 100° C. 150°
5.		A. 30° B. 45° C. 60°

D. Identify shape's properties

例子: 下列哪個陳述是正確的?

A. 小於直角的角稱為銳角。

B. 小於直角的角稱為鈍角。

C. 一個銳角是一個角等於 90°。

1. 下列哪個敘述是正確的?

   A. 有直角的三角形叫做直角三角形。

   B. 有兩個銳角的三角形稱為銳角三角形。

   C. 有兩個鈍角的三角形稱為鈍角三角形。

2. 下列哪個敘述是正確的?

A. 正方形有四個直角，四條邊的長度是不相等的。

B. 矩形有四個直角，且對邊不平行。

C. 矩形是四邊的平面形狀，每個角都是直角。

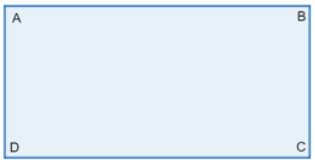
3. 下列哪個陳述是正確的?

A. 一個三角形的內角之和是 90°。

B. 一個三角形的內角之和是180°。

C. 一個三角形的內角之和是270°.。

4. 觀察形狀，然後回答下面的問題。



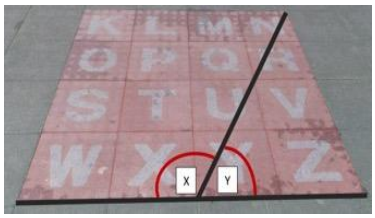
下列哪個敘述是正確的?

A. $\angle A + \angle B + \angle C + \angle D = 180°$.

B. $\angle A + \angle B + \angle C + \angle D = 270°$.

C. $\angle A + \angle B + \angle C + \angle D = 360°$

5. 觀察形狀，然後回答下面的問題。



下列哪個敘述是正確的?

A. $\angle X$ 和 $\angle Y$是互補的角度。

B. $\angle X$ 和 $\angle Y$ 是補角。

C. $\angle X$ 和 $\angle Y$ 是輔助角度，因為它們相加是 90°

Appendix 6. TAM Questionnaire

No	Statement	1	2	3	4	5
Perceived Usefulness						
1	Authentic-UG 可以幫助我得到知識關於角度、多邊形。 Authentic-UG helps to improve my knowledge in learning Angle and Polygon.					
2	Authentic-UG 可以幫助我學習角度、多邊形的能力。 Authentic-UG helps to improve my performance in learning Angle and Polygon.					
3	使用 Authentic-UG 是有用的對於學習角度、多邊形。 Using Authentic-UG is useful for learning angles, polygons.					
Perceived Ease of Use						
4	Authentic-UG 是簡單使用的。 Authentic-UG is easy to use.					
5	Authentic-UG 是容易學習的。 Authentic-UG is easy to learn.					
6	Authentic-UG 是容易理解的。 Authentic-UG is easy to understand.					
Attitude Towards Use						
7	我認為使用 Authentic-UG 對我是有用的。 I believe that using Authentic-UG is a good idea.					
8	我認為使用 Authentic-UG 是適合我的。 I believe that using Authentic-UG is advisable.					
9	我對 Authentic-UG 感到滿意。 I am satisfied in using Authentic-UG.					
Behavioral Intention						
10	在未來我想要使用 Authentic-UG。 In the future I want to use Authentic-UG.					
11	在未來我想要持續使用 Authentic-UG。 In the future I want to continue to use Authentic-UG.					

Appendix 7. ARCS Questionnaire

No	Statements	1	2	3	4	5
Attention						
1	It was interesting when I used the Authentic-UG to measure angle of object in my surrounding					
2	Taking pictures, making annotations and sound records helped to hold my attention					
3	The learning activities by using Authentic-UG could stimulate my curiosity.					
4	The repetition study with peer learning activities caused me to get bored sometimes.					
Relevance						
5	It is clear to me how I used Authentic-UG to learn concept of angle and polygon by using object in my surrounding.					
6	Measuring angle of object in my surrounding make me know how the concepts of angle were used in daily life.					
7	During the activities, I know the examples of used concept of angle and polygon in daily life.					
8	The way of learning concept of angle and polygon using Authentic-UG was not relevant to my needs because I already knew most of it.					
Confidence						
9	When I used the Authentic-UG for the first time to measure the angle, I had the impression that it would be easy for me.					
10	Using U-geometry to learn is too difficult for me					
11	After learning concept of angle and polygon using Authentic-UG, I was confident that I would be able to pass a test on it.					
Satisfaction						
12	I am very satisfied with the Authentic-UG measurement activity.					
13	Peer learning can help me understand angles and polygons.					
14	I can get useful experience angles and polygons from Authentic-UG.					

Appendix 8. Interview Questions

No	Questions
1	Do you like to give a comment on your friend's work? Why? 你喜歡評論一下你朋友的作品嗎? 为什么?
2	Do you like to assess your friend's work? 你喜歡評價你朋友的作品嗎?
3	Do you think the above three questions help you to assess your friend's work? 你認為以上三個問題能幫助你評估你朋友的工作嗎?
4	Do you think the comment from your friends useful for you? 你認為你朋友的評論對你有用嗎?
5	Are you motivated to do more practice after peer activity? 你是否有動力在同伴活動後做更多的練習?
6	Do you think the comment from your friend is fair? 你認為你朋友的評論公平嗎?
7	Are you satisfied with the comment given by your friend? 你對你朋友的評論滿意嗎?
8	Do you have confidence in your comment? 你對你的評論有信心嗎?
9	Do you feel the confidence to give a comment to your friend? 你有信心給你的朋友評論嗎?
10	Are you frustrated after getting a comment from your friend? 收到朋友的評論後，你感到沮喪嗎?
11	Could you tell me which part of the system that you like? 請說出喜歡這個系統的哪個部分?
12	Do you think by measuring angle of real object make you more understand about kinds of angle and polygon? Why? 你覺得用真實的物體來測量角度會讓你更了解"角度"和"多邊形"嗎？为什么?
13	Do you think that drawing a note to your work is important? Why is it important/Why is it not important? 你覺得註記的功能很重要嗎？為什麼它很重要/為什麼它不重要?

Appendix 9. Geometry object at an authentic location

location: Corridor on front of classroom

location: Basketball on back of school

location: Sport field on back of school

Appendix 10. Photo Documentation