GAMES – understanding and developing the use of digital games as a pedagogical tool in the classroom
What is the Games Project

• Collaborative project between Sweden and the UK
• Exploring the use of technology in education, specifically the making and playing of games when working in diverse groups
What is maker culture and maker education?
Why create games?

- Creation and play
- Co-creation and team work
- coding
- Creating artefacts
ICT Pedagogy for SEND

specific areas of pedagogy of particular relevance for the use of ICT for SEN:

• Motivation/Engagement
• Expectations
• Personalisation
• Independence/Autonomy
• Communication
• Working Memory
Focusing on learning not on tech

• Teachers focus on an area the child is experiencing difficulties
• Can we solve it though the use of some ICT?
• Or a combination with non ICT methods; WHEN and HOW is it appropriately used.
• Using a specific interest of the child
Basic Learning Principles

• the instantaneous feedback (i.e. *immediacy*) of the coding programme (*see the result of the action*) supports development of sequencing and logical order skills,

• helps to overcome anxieties about “making mistakes”.

• **Producing an artefact** : Motivation and self-regulation

• This was linked to developing feelings of *independence* in the children:

• Taking turns to work together encourages *Group work* (passive as well as *active learning*)

• **Variety** : a new way of learning : *the potential to review* offered by seeing the list of tasks clearly together on the screen; *to debug* etc.
How do we scale?

- Integrate into curricula
- Competence development: videos
  
  https://www.youtube.com/playlist?list=PLUWLqQ1Et8FTX2w8kVZvK9jUlFDeJsbPU

- Information & guidelines for special education
Suggestions

-use distributed learning methods to scale
-meet and learn in the flesh
-actually do stuff
-you need to learn the subject matter
-put time into
--makerdays
--google hangouts
Stony Dean School

{ Tom Boardman (ICT Co-ordinator) }
Stony Dean, Amersham, Buckinghamshire is a specialist college for Communication and Interaction.

- We currently have 180 pupils aged 11-19.
- We cater for a wide range of needs (ASD, ADHD, Asperger's, VI, Physical, SEMH) but all taught around the needs of their communication difficulties.
- We have small classes of 8-10 with a teacher and at least one LSA.
In order to fulfil the needs of our pupils we use a number of different strategies across the whole school.

- Schedules
- Communicate in Print
- Word-Maps
- Visuals
- SULK (Social use of Language Programme) with our SALT team.
- Behaviour Contracts (HUB)/(PTT)
- Speech and Language Therapy
- Occupational Therapy
Classes (1, 2, and 3)

- Class 1 is a high functioning ASD class.
- Class 2 is a fine motor difficulties/processing/physical impairment class.
- Class 3 is a ADHD/moderate learning difficulties/sensory difficulties class.
We had to adapt the criteria of creating/designing/planning a game to fit it in with our national curriculum.
Pupils were given 6 week introductory lessons into using Scratch and Kodu.
Pupils were given a personalised booklet that incorporated the needs of the project and their special educational needs.
Pupils were then asked to create/design/plan a game either using Scratch or Kodu and evaluate why.
CREATING YOUR OWN GAME

Checklist

☐ Task 1 (Word search)
☐ Task 2 (Matching the definitions)
☐ Task 3 (Label the Kodu Screen)
☐ Task 4 (Label the Scratch Screen)
☐ Task 5 (Tools of Kodu)
☐ Task 6 (Tools of Scratch)
☐ Task 7 and 8 (Questions about choice of Software)
☐ Task 9 (Designing your Game)
☐ Task 10 (Screenshots)
☐ Task 11 (Software Evaluation)
☐ Task 12 (Self-Assessment)

Success Criteria:

- Be able to design and plan a game
- Choose an appropriate piece of software
- Create your game on your chosen software
- Be able to evaluate why you chose a specific piece of software
- State the tools and features you have used
- Be able to provide the code you have used to make your game successful.
Task 3

Label the different tools and features found on the app.

Home, Camera, Insert Hill, Water, Play, Path, Insert a Character, Terrain Tool, Smooth, Insert Spikey Hill

Task 7

Will you prefer to make your game in 2D or 3D?

Why is this?

Would you prefer to use images or text for your programming?

Why is this?
Skills used

- We wanted to use this project to show how coding/gaming can enhance pupils life skills including ‘Teamwork’, ‘Communication through expressive and receptive language’, ‘Patience’ and ‘Problem Solving’.

- We used this project to enable pupils to successfully use team/peer teach strategies, to assist, provide positive communication and demonstrate the skills they acquired into everyday scenarios.
Scratch

- Scratch is a 2D programming application that allows the user to create stories, games and animations.
- It is a text based application that uses different variables and commands.
Kodu

- Kodu is a visual programming tool.
- It is a 3D application that allows users to use images to code rather than text.
Students choice of game

- We predicted that a large proportion of pupils would use Kodu, as it involved the use of images rather than text. This is mainly due to the visual aspect and that pupils can easily recognise/associate the command rather than having to read it.

- We also believed that pupils would enjoy the 3D aspect of designing and creating the game. Asperger states that “Autistic children have the ability to see things and events around them from a new point of view.” (1944/1991, ‘Pg 71’)

- 92% (22) pupils decided on using Kodu with the remaining 8% (2) choosing Scratch.
Pupil A (Class 1) “Communication”

Pupil A has severe receptive and expressive communication difficulties. He would rely on an LSA to complete work for him and would struggle to participate in group activities.

After the project Pupil A became a team orientated individual. He was willingly helping others, participating in class discussion and understanding that it is okay to go get things wrong. He is now a key member of his form group and is confident enough now to stand up in front of his peers and explain what work he has done.

<table>
<thead>
<tr>
<th>Reading Age</th>
<th>Comprehension Age</th>
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<tbody>
<tr>
<td>4.65</td>
<td>5</td>
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</table>
Pupil B (Class 1) “Teamwork”

Pupil B has severe learning and language difficulties, which can mean that Pupil B can often become agitated, confused and upset when having to work in a team or communicating with his peers. In a number of lessons, Pupil B would have negative interactions with two pupils in his class and this would lead to him being sent to the ‘Hub’.

During the project Pupil B began to realise that he could have positive interactions and felt good for it. He worked with everybody in a positive, calm and collective manner. He helped his peers and was willing to take constructive criticism from others.

<table>
<thead>
<tr>
<th>Average (Per Week) incidents for inappropriate interaction with others (Before)</th>
<th>Average (Per Week) incidents for inappropriate interaction with others (After)</th>
</tr>
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<tbody>
<tr>
<td>7</td>
<td>3</td>
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Pupil C (Class 2) “Problem Solving”

Pupil C has ADHD and has Asperger's. He can also struggle with tasks in lesson as he has low self-esteem because of poor social skills and language difficulties.

Pupil C does not like to be given a task that is challenging or that will push him to make decisions independently. If he feels anxious or becomes frustrated he will remove himself out of the lesson and go to ‘PTT’.

This project has slowly helped Pupil C to overcome this fear of challenging himself. Pupil C discovered that he has the ability to work as part of a team and enjoyed working with others, developing their games projects.
Pupil D (Class 3) “Patience”

Pupil D has ADHD and displays autistic traits. This can often mean that Pupil D finds it hard to concentrate and remain impatient and has a rigidity of thinking during certain tasks or times of the day.

During the project Pupil D began to show improvements with his patience. He learnt to help others and use his focus for needing to do something to further assist/challenge his peers.

<table>
<thead>
<tr>
<th>Average (Per Week) Behaviour Incidents (Pinks) Before</th>
<th>Average (Per Week) Behaviour Incidents (Pinks) After</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>2</td>
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</table>
Students choice of game

- Pupil reasons for choosing Kodu were:
  - “The use of images made it easier for me to understand”
  - “I enjoyed being able to design my world and use different tools such as the Terrain tool”
  - “Easier path to follow and made it easier to program/code”

- Pupils reasons for choosing Scratch:
  - “Wanted to challenge myself”
  - “I prefer using a 2D platform”
  - “2D design and games would be easier to see” (VI pupil)
Examples of game designs....
Examples of game designs....
All pupils managed to create a game and completed their project evaluations. It was a surprise to see a large proportion of pupils stating that some of the skills that they learnt from this project were both academic and social. For example pupils have stated that they learnt;

- “I learnt to work as part of a team on a task.”
- “I improved my communication skills by helping my friends out.”
- “I learnt how to talk with my mates which I would normally find hard.”
- “I learnt how to solve a problem that I did not think I could do.”

This is a major breakthrough for the pupils as a large majority of them struggle within a social setting. The fact that they can independently and confidently help their peers and be able to use and improve their communication skills is superb.
Summary

- Our students were engaged throughout the project due to the ability to access the software.
- Key features of the software were; visuals, sequencing and the ability to test their game.
- The setting of a shared common task enabled students to personalise their work enough that they were able to take constructive criticism on their work.
- This software could be used to deliver other subject content to improve the quality of the teaching and learning. This would be possible because of their ability to access the software easily.
As an added extra 😊, Stony Dean school conducted an experiment with a Year 11 class and Minecraft for Education.

We wanted to see how it could be used outside of ICT/Computing and be used as a resource cross curricular.

Year 11 used Minecraft to build a Medieval castle as a humanities project. This was included as part of the project and Minecraft was used after pupils spent around 4 lessons learning about castles and their use.
Language disorder
Moderate Learning Difficulties
Social interaction difficulties
Significant processing difficulties

Autistic Spectrum Condition
Extreme ADHD
High Anxiety arising from cognitive and social difficulties
Extreme Challenging behaviour
Non-compliance, verbal and physical outbursts.

Significant social interaction difficulties
Challenging behaviour
Language disorder
Before Minecraft...

If you were to meet Pupil D or observe him in team building tasks, you would see that he is a natural leader, taking charge and coming across as highly confident.

If you were to meet Pupil E, he is a talkative and creative young man. However his social interaction difficulties make it hard for him to work as part of a team. He would show no leadership or teamwork skills in group work.

Pupil F is a quiet and unconfident young man, who struggles severely with communication and social interactions. He is easily influenced by others and struggles to maintain mature behaviour with his peers.
Pupil D was still able to take leadership and began to communicate positively with his peers. He was still the natural leader and worked well the others.

Pupil E began to show natural leadership/problem solving/team work skills whilst completing this project. He was handing out jobs, explaining his responsibilities and building positive interactions with others.

Pupil F slowly came out of his shell and began to not be influenced by the others and make his own decisions. He also started to communicate positively with his peers.

After Minecraft...
Evidence of work
Evidence of work
Evaluation..

- We found that using Minecraft as a learning tool was hugely rewarding and successful for pupils.
- Pupils like using it and it can be used to relate to things from real life scenarios and concepts that they understand.
- As well as reinstating learning and subject concepts, it allows pupils to develop socially and provides the basic life skills that we all take for granted.
Any Questions?
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Dr Maria Kambouri - UCL
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Tom Boardman – Stony Dean School