Bruner's Spiral Curriculum for Teaching & Learning
Summary Overview

Why is the issue important?

In 1959, Jerome Bruner brought together the world's leading educationalists to think through what a meaningful curriculum could/should look like. The ideas about the curriculum that emerged related to checking teaching and learning experiences through which students could not only learn new things but construct meaningful understanding. These ideas, which became known as "constructivist" and which Bruner put forward in *The Process of Education* (1960), underlie many contemporary approaches and practices, such as thinking skills and assessment for learning and have the potential to support curriculum development and innovation in practical and inspiring ways.

What are the key messages?

Bruner argued that for 'transfer' to happen, children needed to learn to make connections between different experiences in learning rather than just master facts. To achieve this, he advocated learning through enquiry, with the teacher providing guidance focussed on accelerating children's thinking. He recommended that the early teaching of any subject should emphasise grasping basic ideas intuitively. After that, he believed the curriculum should revisit these basic ideas, building upon them incrementally until the pupil understands them fully and in depth (the spiral curriculum). He also felt it was important that pupils learned the 'fundamental principles' of a subject, the connections between ideas within subjects. You can find more about Bruner's ideas here (web link to full).

How did Bruner arrive at his ideas?

Bruner, a psychology professor at Harvard, chaired a ten-day conference in 1959 attended by 35 delegates (experts in science, psychology and education) who had gathered together to discuss how education in science might be improved in primary and secondary schools. The delegates explored conceptual questions about learning and teaching, such as, what should be taught, when and how, and how the structure of a subject could be structured so that it gave students a sense of the fundamental ideas as quickly as possible. Afterwards, Bruner wrote a report based on the views debated at the conference and the correspondence that followed it.

What are the implications for teachers and leaders?

Teachers may wish to consider the following implications of Bruner's theory of teaching and learning he put forward in his book, *The Process of Education*.

- Like Vygotsky, Bruner believed that effective teaching involved starting from what children know already and providing them with guidance that moves their thinking forward. How do you go about identifying your pupils' current knowledge to help you identify the next steps they need to take? Would asking them to create a concept map of what they know about a topic (before you start to teach it help you plan strategically in the light of knowing about gaps in understanding?) a few words

- Would you find it helpful to explore ideas with colleagues connections between basic ideas across the subjects you teach and share effective ways of helping pupils discuss and make those connections for themselves at different stages of development?

- Bruner thought it important for pupils to develop intuitive thinking, although he recognised that it was difficult to foster. Could you provide more opportunities for your pupils to guess at answers before checking whether their hunches are valid, whilst taking care to make them feel comfortable about sharing them?

- Bruner advocated learning by enquiry and problem solving, which requires pupils to hypothesise, ask questions and discuss lines of investigation. Could you provide more opportunities for pupils to work together in groups to solve problems? Would you find it helpful to share ideas with colleagues about kinds of problems that enthuse pupils?

Leaders may wish to consider the following implications:
- Bruner's ideas underpin current cognitive acceleration strategies. Do you have colleagues who use cognitive strategies effectively in their teaching who could coach others in their use? Or would it be possible to offer teachers time to work together to plan cognitive intervention strategies and spread good practice within and also beyond their own departments?
- The RfT summary (which can be accessed in full here: http://www.ntrp.org.uk/sites/all/documents/Jerome%20Bruner's%20constructivist%20model%20and%20the.pdf) shows how Bruner's ideas also underpin current assessment for learning practices which help pupils learn how to learn. Would professional development activities geared towards deepening and extending formative assessment practices help your colleagues to help their pupils take more responsibility for their own learning?
- Much of Bruner's writing applies as much to teachers' own professional learning as their pupils' learning. Would your colleagues find it helpful to share with each other examples of where Bruner's theory of teaching and learning underpins the ways they are developing own classroom practices?

What do the case studies illustrate?
The following case studies show how Bruner's ideas apply to current school settings.
- Bruner argued that teaching should lead cognitive development, by providing challenging opportunities for the pupil to forge ahead in development and that learning should start from where the learner's connect ideas, knowledge and skills . The first case study shows how some geography teachers set about diagnosing the current stage of pupils learning in ways that helped them at, accurately identify the next step that would move the pupils on.
- Bruner advocated that learning should be through discovery and enquiry and believed that intellectual activity is fundamentally the same for everyone. The second case study shows how a teacher designed an enquiry based history project in which pupils learned to use the approach used by academic historians.

Case Study 1: Using geography mysteries to observe students' learning
This case study shows how teachers used mysteries to diagnose their students' thinking and how this enabled them to provide a next step that would move their thinking forwards. Mysteries offer the possibility of observing students working in ways that reveal their thinking processes. The first aim of the study was to identify differences in the ways that high and low achieving groups tackled the mysteries. It found that groups progressed through a series of observable stages of thinking. The second aim of the study was to see how teachers used their knowledge of these stages of thinking to scaffold student learning.

The metaphorical term 'scaffolding' is used for the instructional support, often in the form of adult-child dialogue that is structured by the adult to maximise the child's development or growth. As the child develops increasing mastery of a given task, the adult gradually withdraws the support, until eventually, the initial scaffolding is removed altogether. To scaffold a student is learning effectively, the teacher

needs to stay one step ahead of the student, always challenging him/her to reach beyond his/her current ability level.

What are mysteries?

Groups of two to four students are presented with 15-30 pieces of information on a topic (for example, hurricanes or earthquakes etc) with each piece of information provided on a separate slip of paper (the data items). The information includes trigger and background factors. The group is also given a question to answer. For example:

'There was an elderly couple living in Kobe, Mr and Mrs Endo. One of them died in the earthquake disaster – which one and why?

The group is encouraged to use as much of the information they have been given as possible when formulating their answer. Not all of the information given is necessarily relevant to the question.

What stages were involved in tackling mysteries?

Five progressive stages of thinking were identified by the study:

- **the display stage** – simply spreading out the data items on the table so that they could all be seen and read easily

- **the setting stage** – organising the data items into sets with common characteristics, usually arranged as columns or blocks

- **the sequencing and webbing stage** – identifying relationships between the sets or between single items

- **the reworking stage** – the establishment of new sets of relationships between the sets or between single items

- **the abstract stage** – the physical manipulation of the data items ceased, but the discussion continued.

How were the stages of thinking identified?

A range of data were collected during the study:

- photographs of all the groups as they worked on a mystery on a set time interval, to provide a simple time lapse of how the students physically arranged the slips of paper
- videos of high and low achieving groups doing mysteries
- interviews with groups of students using a technique called stimulated recall, which involved showing students a video of their group doing a mystery and asking them to comment on what they were doing and thinking as they worked
- observation notes of the students that were photographed and videoed.

The data were then analysed on two fronts:

- the photographs were compared with the observation notes to define phases that students generally went through when physically arranging the data

- the notes and transcripts from the student interviews were compared with the phases in data manipulation to calibrate these stages with students' descriptions of their thinking.

How did the teachers use mysteries to scaffold learning?

Through observing pupils working through the mysteries, the teachers were able to see the patterns and shapes of development in their students' thinking skills, or lack of them. By setting the thinking

strategies they observed their students using within the context of the progressive stages, the teachers were able more accurately that would edge the students onto the next stage in their ability to reason and process data.

Example 1

In one case, a low achieving group of twelve year olds were doing a mystery which concerned the disappearance of a tribe of Amazonian Indians. The slips of paper included:

- information about gold prospectors
- water pollution
- infectious diseases
- hunting practices
- poverty among the non-Indian population etc.

The group of four boys were having great difficulty with the mystery. The teacher visited them and pulled out a data item about the tribe's water supply. She then asked them to find any other data items about water and left them to work alone. With this action, the teacher had diagnosed a weakness shared by the whole group in classifying/grouping data and demonstrated how they could undertake the next stage in working towards a solution. When the students had grouped several data items about water, the teacher returned to suggest that they might form a group about diseases and health. This enabled her on a third visit to start asking them about the possible connections both within and between the two groups of data items. The students thus took their first steps on formulating an explanation.

Example 2

A group of 14-15 year olds of higher ability were doing a mystery that focused on who was to blame for the need to demolish a block of (public housing) flats in a British city. The data items included reference to:

- the faulty materials and technology used in the building
- the anti-social behaviour of some of the residents
- the destruction of the community which lived in the terraced houses that were cleared to build the high-rise blocks
- the physical deterioration of the building
- the fears of residents in the flats with young children.

A group of girls had initially sorted their data into two groups: one representing reasons for the demolition and the other against. But in fact, they were not addressing the task and were classifying in an unproductive way. When their teacher pointed this out to them, they began to re-sort the data bearing in mind the need to attribute blame or reasons. This time they formed groups related to the local council, the builders, the anti-social residents and the government.

Example 3

Another group of higher ability 14-15 year olds were about to do a mystery on hurricanes. The teacher asked the students how they could go about tackling the task. They volunteered six strategies, including sorting more and less important reasons, making it into a story, working out a time sequence and sorting relevant from irrelevant information. By doing this, they revealed that not only did they have a range of strategies, they had the beginnings of a language to talk about cognitive processes.

Reference: Leat, D. & Nichols, A. (2000) Observing students' mental strategies: signposts for scaffolding. *International Research in Geographical and Environmental Education,* 9 (1), pp.19-35

Case Study 2: Learning to be history detectives
This case study shows how a teacher introduced her class to the investigational approach used by academic historians – an approach that involves evaluating and interpreting fragmentary and sometimes contradictory evidence from a variety of primary sources. The teacher developed a week-long local history project for her class of 8-9 year olds in which the objective was to solve the mystery of the suspected murder of Samuel Whitehouse, who died in April 1822 in Warley Woods. The project emphasized whole class enquiry: the children were encouraged to take on the role of history detectives – to think of questions, follow a line of enquiry and make hypotheses. At the end of the project, the children wrote an account of the event and completed questionnaires about their experiences.

As history detectives, the pupils were involved in a number of activities:
- asking questions and hypothesizing
- discovering clues
- presenting arguments and developing reasoning skills
- writing an account.

The 'history mystery' grew from:
- the discovery of a newspaper report of a trial referring to a possible murder in April 1822
- a legend surrounding a ghost
- architect's drawings of a gothic abbey.

Asking questions and hypothesising
The teacher began the project by giving her pupils the following task:

"Murder most foul!?! – On Wednesday April 3rd 1822 the body of Samuel Whitehouse was found here, with severe head injuries. Your task is to find out if he was murdered. Who or what could have startled his horse?"

The children were shown a horseshoe that had been found at the site. In their role as history detectives, the children were asked to formulate questions that would help them work out what had happened to Samuel Whitehouse. The task was displayed and the children were given worksheets to record their questions on. To begin with, the children discussed their questions with a partner, then shared their ideas with the rest of the class. All the questions were written up and discussed by the class. Altogether, the children raised 44 different questions, for example:
- Who found him?
- Other than the horseshoe, were there any more things found lying about where the body was found?
- Why was he on a horse?
- What was he doing there?
- Which part of the wood was he found in?

Discovering clues
All the children took part in a treasure hunt on the computer in pairs or independently. The game comprised hyperlinks in MS Word to pages containing information about people, places, maps, facts and interviews related to the trial. The history mysteries game enabled the children to revisit lines of enquiry to help them to remember relevant evidence they could later include in their written accounts.

Presenting arguments and developing reasoning skills
For this activity, the classroom was rearranged to form a court of law. The children decided who could be asked to stand as witnesses (for example, the local blacksmith and publican) and chose children from the class to take on the roles.   They also chose a child to be the judge. The other children were expected to take turns in cross questioning and interviewing the key witnesses to try to establish the truth of what happened to Sam Whitehouse. The judge's role was to maintain 'order in court' when the questions came too quickly, and the jurors or the public became too excited. All the children were expected to ask questions and make notes. At the end of the session, the class discussed which questions caused the witnesses to reveal more evidence or detail.

Writing an account
The main writing task was an extended piece of writing in the genre of J. K. Rowling. The teacher began the session by introducing the Gothic building of the Abbey as Hogwarts' Field Centre for Magic Education, and the Grey Lady – Warley Abbey's ghost. The children were shown a picture of Warley Abbey and asked to think of words they could use to describe it. They were given time to reflect on their ideas in their heads, write down notes and then share their ideas with the whole class. The vocabulary they produced ranged from words to describe characters, sounds, smells, magic and mystery.

What did the children learn from the project?
At the end of the project the children were able to put forward a variety of plausible reasons for the cause of Samuel Whitehouse's death and their written accounts reflected the questioning approach they had experienced, for example:

"Grey Lady," said Harry "Is it true about the murder of Samuel Whitehouse?"
"Yes, it is true. I saw Sam's horse riding off. And that is all I saw."
"Thank you. I must go and see where he was found. Tomorrow we are going to find out some clues about when he died. I wonder if he was murdered. Who found him?"
"I didn't see that."
"Was the body dead?"
"I'm not sure about that."
"Was it the blacksmith who killed him?"
"I don't think he wouldn't do anything like that."

The children's answers to the questionnaire revealed how their ideas about history had changed and how they were more aware of bias and different interpretations of events:

"It made me think that history is a mystery, that no-one knows what happened."
"They (the questions) changed my ideas about history because now I know that people from the past can lie and be truthful."
"They (the questions) changed my ideas about history because I didn't think a murder back then would still be this serious today."

Reference: McIlroy, C. (2004) *History Mysteries: History, Literacy and ICT at Key Stages 1 and 2 Harry Potter, the Warley Woods Mystery and Literacy across the Curriculum*. National Teacher Research Panel

To find out more, view the full Research for Teachers document on the NTRP website [here](#).