3

JEAN PIAGET

UNDERSTANDING THE MIND OF THE CHILD

LEARNING OUTCOMES

Having read this chapter you should be able to:

- recognise stages of child development according to Piaget
- understand how his work has influenced past and present education practice
- recognise how his work changed the way in which the child was viewed
- critically evaluate his work.

KEY WORDS

cognitive development; adaptation; schemas; equilibrium; disequilibrium; assimilation; accommodation; preoperational; sensorimotor; egocentric; conservation; concrete operational; formal operational

INTRODUCTION

Jean Piaget was just eleven years of age when he wrote his first scientific article on the subject of albino sparrows; this work marked the beginning of a brilliant scientific career in which he wrote several hundreds of articles and papers and over sixty books (Halpenny and Pettersen, 2014). Despite having no official qualification in psychology, sociology or epistemology, he was arguably the most dominant voice in child psychology for a large part of the twentieth century (Schaffer, 2004; Kohler, 2008), and while he never intended his work to directly influence educational peda-gogy, we will see in the latter part of this chapter that curricula past and present have been guided by Piagetian principles.

Piaget was one of the first theorists to study how children think and learn, and while his contemporaries saw learning as either intrinsic, from the child, or extrinsic, from the environment, he believed that neither fully expressed learning and that it was the child's interactions with the environment that generated learning (Mooney, 2000). He saw children as constructors of their own knowledge, taking information from the people and objects in their environment and making meaning from them.

Piaget used his observations of children as a basis for his work and established from this that children's own curiosity would drive their learning, and that the most effective way of enabling learning was to provide an environment which promoted curiosity and challenge and allowed children to control their own learning. This required those working with young children to facilitate the appropriate learning experience, nurturing enquiry and supporting children in finding their own solutions to problems.

Piaget is perhaps most well-known for his stages of development, and these have been the subject of the most significant critiquing of his work. Through both his obser-vations of children and his experimental work, he established that children pass through a series of stages when developing their thinking skills, and while an approx-imation of the age in which stages were passed through was given, he believed that this was sequential, and each stage must be fully achieved before the next could com-mence. In view of this he did not believe that a concept could be 'taught' directly to children; rather, children must build their own knowledge of a concept based on their previous experiences.

While many would argue that this is an outmoded way of thinking and that children develop much sooner than Piaget's theories would suggest, we will see throughout the course of this chapter that his influence in the field of psychology is unquestionable and the impact of his work in the field of education is vast. As Schaffer states:

> ... his enormous output of theoretical propositions and empirical observations during a long lifetime transformed our way of thinking about children and their intellectual development. (2004: 160)

JEAN PIAGET, THE PERSON

Born in Neuchâtel, Switzerland, in 1896, Piaget was the eldest child of Arthur Piaget, a professor of medieval literature at the University of Lausanne, and Rebecca Jackson. He was brought up in a household with conflicting religious views, since while his mother was a devout Christian, his father was a staunch atheist and, as described by Halpenny and Pettersen, 'it appears that these conflicting religious views and beliefs were the origin of many a conflict in the Piaget household'; they also go on to suggest that this may in part be the reason why Piaget began to 'develop an interest in intellectual discussion and hypothesis' (2014: vii).

Although Piaget is best known for his work on the **cognitive development** of children, his early interest was in fact in biology, and having written his first article on the subject of albino sparrows, he then went on to write and publish a number of papers on molluscs. Despite his young age (he was still in his teens when the papers were published), many people considered the young Piaget to be an expert in the field of malacology (the study of molluscs). This interest in biology resulted in his studying zoology at Neustadt University, where he was awarded a PhD in the natural sciences in 1918.

Piaget's interest in psychology, and psychoanalysis, began following a period studying under Carl Jung and Paul Eugen Bleuler at the University of Zürich, and subsequently he spent a year in France working at an institute for boys created by Alfred Binet, *l'École de la rue de la Grange-aux-Belles*. Binet was responsible for devising a series of tests designed to measure intelligence, and Piaget, working under the directorship of Binet's colleague Theodore Simon, was tasked with standardising Binet's test of intelligence. However, Piaget became less concerned with the results of the tests, focusing instead on how the students had come by their answers rather than the answers themselves – hence the development of his first experimental studies of the mind.

Like many of his contemporaries Piaget held numerous positions, successively and simultaneously, in the fields of psychology, sociology and science, in a range of institutions, including the University of Neuchâtel (1925–9), the International Bureau of Education (1929–67) and Lausanne University (1938–51). Throughout his tenure in these positions Piaget built on his observations at *l'École de la rue de la Grange-aux-Belles* and sought to find out how knowledge grew.

As a genetic epistemologist Piaget was interested in human knowledge, most specifically the nature of thought and how it develops: 'while others asked what children know or when they know it, Piaget asked how children arrive at what they know' (Mooney, 2000: 59). Building on this concept he researched and wrote prolifically on the subject of child development for over sixty years. In his early studies he observed children at play and noted that those of the same age tended to make similar mistakes. From this he ascertained that children 'do not just know less but think differently from adults' (Jarvis and Chandler, 2001: 131). He then went on to

conduct a number of experimental studies with children, initially using his own chil-
dren, whom he studied from their infancy, and later studying larger numbers of
children in a psychology laboratory.

From his experimental work, as noted above, Piaget postulated that children
pass through stages as they develop towards adulthood and that it is necessary for
each stage to be successfully accomplished before moving on to the next. He did
not believe that cognitive development was a continuous process, but rather a cog-
nitive revolution (Mitchell and Ziegler, 2007), in which the child sheds early
cognitive limitations as they shift to a 'new and more sophisticated plane of intel-
ligence' (2007: 10). Indeed, he was particularly interested in the development of
intelligence and believed that this was an important factor in explaining how chil-
dren adapted to their environment. He categorised the environment into two
distinct areas: the human, social or psychological environment and the physical
environment, in which adjustments to both were of equal importance. Many of his
early theories centred on the idea of **adaptation**, in which in order to move
through the stages of development, adaptation to existing **schemas** was required
in order to develop revised schemas to fit the new situation. This will be explored
further in the next section of the chapter.

Piaget's work has directly influenced American pre-school programmes and many
elements of his theory can be seen within the English Early Years Foundations Stage
curriculum, which will be discussed later in the chapter. While his work has often
been described as being difficult to read and intimidating to the classroom teacher
(Mooney, 2000), and despite criticisms of the processes of that work, it cannot be
denied that it has helped practitioners in early education to consider more closely how
children think. Piaget was an active researcher for over sixty years, publishing over
sixty books and over a hundred articles on the subject of cognitive development. On
his eightieth birthday he decided to rectify his missing psychology qualification by
taking an examination, subjecting himself to a colloquium for PhD candidates (Kohler,
2008). However, Kohler (2008) explains that since the examination could not be held
under the official university authority he never achieved this formal qualification, cit-
ing Piaget (1976) who observed 'I shall die without an actual degree and shall take
the secret of my educational shortcomings to my grave' (Kohler, 2008: 238). He
remained active in the field of cognitive psychology up until his death in 1980.

PIAGET'S THEORY OF COGNITIVE DEVELOPMENT

Piaget's theories centred on his fascination with how children think and learn, and
from this he focused his work on three specific areas: how children acquire
knowledge, how their thinking differs from that of adults, and how cognitive
development can be classified into stages (Jarvis and Chandler, 2001). Through his
observations of children, he identified that even very young children are intrigued

by their environment and their own abilities to interact with it. He theorised that it is through their interactions with the environment that learning proceeds; however, in order for learning to take place it is necessary for children to construct their knowledge by making meaning of their experiences. He proposed that the human mind contains structures which allow it to make sense of the world, namely schemas and operations (Jarvis and Chandler, 2001).

A *schema* refers to the mental structures in the mind in which the individual stores all the information gathered from the world around them. Piaget believed that babies are born with innate schemas which enable them to interact with others; however, as their experiences increase they begin to form a plan or representation in their brains which aids them in developing new schemas. The more experiences an infant has, then the more schemas they construct. Once the infant can comprehend everything around them they are said to be in a state of **equilibrium** – this being a state whereby the world can be understood through the existing schemas. Of course, given the vast number of experiences the infant is likely to be exposed to, it is frequently the case that existing schemas cannot explain a new situation, in which case the infant finds themself in a state of **disequilibrium**.

According to Piaget, human beings are programmed to try and make sense of the world, and therefore a state of disequilibrium is an uncomfortable place to be. He identified two processes by which equilibration (attaining equilibrium or balance) could take place: **assimilation** and **accommodation** (see Figure 3.1). Through the process of assimilation the infant is able to adapt an existing schema in order to make sense of a new experience. For example, an infant may have already developed a 'bird' schema constructed through experience with the family canary, which will then be assimilated to accommodate a first encounter with sparrows in the garden since these too will fit into the 'bird' schema (Jarvis and Chandler, 2001). However, in the case of accommodation an experience may not readily fit into the existing schema and a new schema will be required. So, in the case of the 'bird' schema, on their first encounter with an aeroplane the infant will find the object too distinctive to fit into the existing 'bird' schema, in which case an 'aeroplane' schema will need to be formed.

According to Piaget, schemas are continually changing, and are an essential part of cognitive development. He referred to the processes of assimilation and accommodation as adaptation, in which children are taking in new information, changing existing ones or forming new ones, and adapting behaviours in order to make sense of the world around them. Furthermore, Piaget saw this process of adaptation as supporting through four identified developmental stages (see Figure 3.2).

Piaget's stage theory of development was based on his belief that as well as making sense of the world around them, children need to understand the rules by which that world functions, referring to these rules as operations. He believed that these operations develop as the brain matures rather than through experience; as such, whether the child has any operations will be dependent upon their age. He referred to

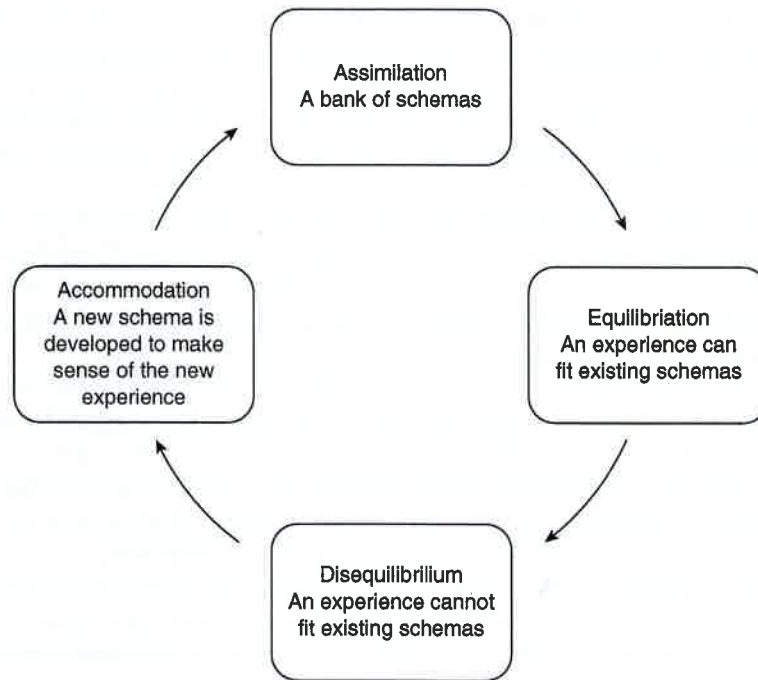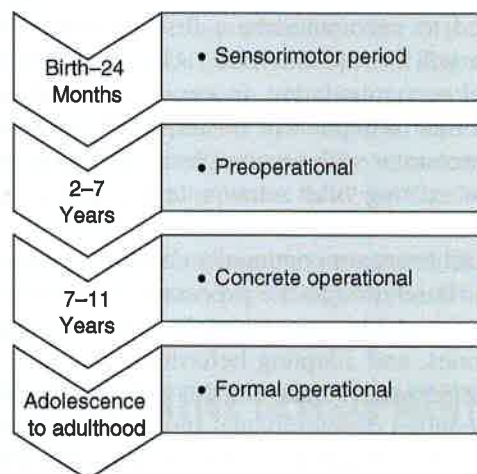**Figure 3.1   Piaget's dual processes of adaptation**

Figure 3.2   Piaget's developmental stages

the very young child as **preoperational** since they have not yet developed the brain capacity to form operations. As the brain develops then so does the child's ability to form and understand operations, and it is on this basis that he formed his stage theory of development.

As seen in Figure 3.2, Piaget suggested an approximate age for each stage of development, and while these were only intended as a rough guide (Mitchell and Ziegler, 2007), he theorised that stages were fixed and invariant, with each stage serving as a foundation for the next, and that no stage could be missed or rendered incomplete. He believed that each stage was reached as the brain matured, permitting 'the use of new types of logic or operations' (Jarvis and Chandler, 2001: 138).

Looking at each stage independently, the first stage identified by Piaget was the *sensorimotor* stage, occurring approximately between the age of zero and two years. At this stage he suggested that the main focus is on the development of senses and movement, by which the infant makes sense of the world directly from information gathered through sensory experiences. Infants at this stage are fascinated by their own bodies and what they can do with them and will quickly transfer their experimentations with their own bodies to the objects around them. Towards the end of this stage infants experience increased mobility and they will actively explore their environment, and their innate curiosity will lead them to further experimentation within their wider environment.

It is during this stage that Piaget suggested infants develop their understanding of object permanence – that is, knowing objects have a permanence in the world, and that 'out of sight' is not 'out of mind' (Brain and Mukherji, 2003). Once object permanence has been developed the infant will await the return of an object because they know it exists even when they cannot see it. It is also at this stage that the infant develops an awareness of themselves as separate from the world.

Piaget referred to the second stage of development as the *preoperational stage*, occurring between two and seven years of age. His assertions at this stage focused on what the child was unable to do, and he believed that during this stage the child needed constant stimulation in order that new schemas could be formed through the joint processes of assimilation and adaptation. He did, however, recognise that at this stage the child had developed sufficient language for thinking to be based around symbolic thought rather than through physical sensation (Jarvis and Chandler, 2001); although as the stage name suggests, they are not yet able to grasp logical rules or operations. At this stage Piaget saw the child as being highly **egocentric** – that is, they can only view the world from their own point of view.

He also suggested that the preoperational child had difficulty in understanding the concept of **conservation** and many of his early experiments focused on conservation tests. He established that children in the preoperational stage lacked the ability to understand that a concept such as volume, mass or number stays the same even if the

situation has changed. So, for example, one of his most well-known experiments required pouring the same amount of water into two identical beakers. Once the child had agreed that the volume was the same Piaget would transfer the contents of one beaker into a wider beaker. A child at the preoperational stage would automatically assume that there was less water in the shorter beaker because the water level was lower, even though they had seen the water being transferred. Hence he deduced that the child was unable to understand the concept of conservation.

Piaget theorised that cognition develops over time and a certain level of maturity is required before stages can be reached. Children who cannot conserve are said to be unable to decentre – that is, they are only able to focus on one thing at a time. For example, if given sets of pencils, red and blue, and long and short, the preoperational child would only be able to sort these into two groups, either red or blue or long or short, not a combination of each.

Piaget's third stage of development occurred between the ages of seven and twelve years and he referred to this stage as **concrete operational**. At this stage, the child is able to perform more complex mental operations and, significantly, is now able to decentre. They can conserve volume and number and are able to take in the viewpoints of others. While Piaget recognised that children at this stage had the capacity to solve problems, the problems had to be real, or concrete, and they were not yet able to solve imagined or hypothetical problems (Mitchell and Ziegler, 2007).

It is not until the final stage, **formal operational**, that children are able to solve hypothetical problems and this, according to Piaget, occurs between the ages of twelve and nineteen years. At this stage children no longer require actual concrete objects to solve problems and are able to carry out mental problems in their heads using abstract terms. He 'suggested that not everybody achieves formal operational thinking' (2007: 25) and in order to reach this stage a wide range of experiences is required.

Building on his theory of cognitive development, Piaget later theorised on the moral development of children in his 1948 text *The Moral Judgement of the Child*. In this text Piaget observes that:

> All morality consists of a system of rules, and the essence of morality is to be sought for in the respect which the individual acquires for these rules. (Piaget, 2013 [1948]: 13)

As with his theory of cognitive development, which sees children move through a series of increasingly complex stages of thinking, Piaget's theory of moral development proposed that children's moral reasoning also moved forwards in phases which directly correlated with the increasing complexity of their cognitive ability (Vozzola, 2014).

Piaget's theoretical work on moral development saw him conducting interviews with children about their understanding of and respect for the rules of the game of marbles, asking questions such as, *'Can new rules be invented?', 'Could new rules lead to new games?'* and *'Which rules are the fairest?'* (Vozzola, 2014). From his interviews Piaget theorised that:

- Very young children showed little regard for formal rules although they handled the marbles as though they were 'playing the game'.
- Between the ages of two and five years children would imitate rules of the game but still played egocentrically and failed to use unifying rules.
- At the ages of seven and eight children become interested in trying to win and try to use standard rules, although not consistently.
- By ages eleven and twelve children can codify rules and can play with a degree of harmony.

(Vozzola, 2014)

Piaget saw moral development proceeding in two stages. In the first stage, between the ages of five and ten, children have little concern for moral reasoning as they focus on other skills such as social development. Piaget saw this period of moral reasoning as being external to the self, and children view morality through a heteronomous lens in which rules are made by those in authority and as such were not to be broken at any cost (Dombeck, n.d.). Children adhere to rules for fear of the consequences of breaking them rather than due to an understanding of the rules themselves, and any moral reasoning for compliance was to escape punishment rather than out of respect for the rules themselves. Piaget referred to this stage as the *morality of constraint*, in which the egotistical nature of the child means they are only able to comprehend a situation from their personal viewpoint.

In the second stage children begin to show a greater respect for regulations as they move out of the egotistical stage and begin to see things from the perspective of others. Piaget referred to this as a *morality of cooperation*, in which children are able to work cooperatively with others, adapting rules through negotiation and mutual consent. This stage is characterised by flexibility and a less stringent adherence to rules; additionally their definition of right and wrong can change depending on the situation as they begin to engage in moral reasoning. Children in this stage also begin to recognise why rules exist in order to maintain order and structure, but also begin to see how punishment should be fair and equitable, developing a strong sense that punishment should fit the crime.

It can be seen, then, that the depth and breadth of Piaget's work is far reaching, and as we shall see later in the chapter his work has influenced practice in education settings. However, firstly it is pertinent to examine the influence of Piaget's work with that of other theorists in the field of education.

LINKS WITH OTHER THEORISTS

Piaget was influenced by the work of Maria Montessori, particularly the importance of facilitating first-hand experiences for the child in order to support their cognitive development. Like Montessori, he recognised and valued the importance of play as a

vehicle by which children could construct knowledge and he linked this to his stages of development, suggesting that at each stage a different type of play could be observed based on what the child was capable of. Montessori, too, subscribed to the idea that children have a readiness to learn at certain developmental stages and, as such, she suggested that the learning environment should be a supportive one allowing cognitive development to proceed through free exploration. While Piaget recognised the importance of such free exploration, he was also critical of Montessori's work, suggesting that it was not open-ended enough and lacked the opportunity for creativity and exploration to take place (Halpenny and Pettersen, 2014).

Dewey's work can also be seen reflected in Piaget's theories since, like Dewey, he recognised the importance of satisfying a child's curiosity in order for learning to take place. Indeed, he believed that a child's curiosity is responsible for driving their learning (Mooney, 2000). As seen in Dewey's work, Piaget reinforced the idea that the teacher should facilitate rather than teach, presenting children with problem-solving challenges rather than merely imparting knowledge, and, as Mooney suggests, this 'requires changing the image of a teacher into someone who nurtures inquiry and supports the child's own search for answers' (2000: 62).

While Piaget's work is undoubtedly the most well-known when examining cognitive development (Jarvis and Chandler, 2001), when considering links to other theorists it is pertinent to consider the work of other cognitive theorists, namely Vygotsky and Bruner, whose work is examined in Chapters 4 and 8 of this book.

Vygotsky, a contemporary of Piaget, agreed that cognitive development proceeds in stages which are characterised by different ways of thinking (Jarvis and Chandler, 2001); however, whereas Piaget emphasised the importance of a child's independent exploration of the world, Vygotsky believed that social interactions were essential for learning to take place. Piaget's theory advocated that a child would reach the appropriate stage of development at a time that was appropriate to the individual child and, as such, the practitioner should not 'push' the child, instead believing that the stage would be reached when the child was mentally ready. In contrast, Vygotsky believed that with the right social interactions the child could achieve developmental readiness earlier than they might otherwise; as such, cognitive development was influenced by their interactions with more knowledgeable others.

Bruner too was influenced by both Piaget and Vygotsky; however, he rejected the idea of developmental stages completely, instead suggesting that cognitive development was influenced by different modes of representation, relating to the forms in which information is stored in the mind. Bruner saw development as a continuous process rather than a series of stages and, like Vygotsky, believed that development could be advanced through interactions with others. Nevertheless, Piaget's theories are reflected in Bruner's work, particularly with regard to the natural curiosity displayed by children and in his assertion that children are active participants in their own learning.

Finally, Piaget's findings on the development of moral development influenced the work of Lawrence Kohlberg, who extended Piaget's two stages of moral development

into six (Fleming, 2005). However, as observed by Fleming (2005), where Piaget considered a child's concept of morality to come from a logical perspective, Kohlberg viewed this through a philosophical lens, arguing that an understanding of moral development could not be gained without first establishing a definition for morality. Kohlberg presented children with a series of moral scenarios, in which right or wrong was not always clear. He then assessed their level of moral development not through the responses they gave, but through the reasoning behind how they had reached their conclusions. Nevertheless, despite their differences in approaches, Kohlberg's findings are similar to Piaget's in that he too saw moral development as one which was closely tied to cognitive development, since he surmised that moral principles were developed through thought processes as children grapple with dilemmas as they emerge. Moreover, like Piaget, Kohlberg also identified that a state of disequilibrium was common as children struggle with punishments that might seem unduly harsh or unfair.

CRITIQUING PIAGET

It cannot be denied that Piaget's work was a dominant force in child psychology for a significant part of the twentieth century, yet he was not without his critics and many have sought to identify flaws in his work which might disprove his theories. From the 1960s onwards comparative studies on his experiments were undertaken and, while early replications yielded the same results, researchers began to criticise his methods and modify his experiments (Kohler, 2008). For many it was his research methods which were called into question, particularly given that his early experimental work was carried out with his own three children. This in itself suggests an unreliable scientific method, in which generalisations cannot be formed and where researcher bias is a potential risk, particularly given the clinical methods applied. Even when Piaget widened his sample group, this was with the children of well-educated professionals with high socio-economic status, making it an unrepresentative sample. It could be argued that this sampling resulted in an overestimation of the abilities of children in the concrete operational stage, since studies undertaken by Sutherland (1992) revealed that children of working- or middle-class background only reached the concrete operational stage at the age of twelve, not reaching formal operational until the age of sixteen, thus operating a full stage behind that which Piaget theorised. A further criticism of Piaget's work is in the complexity of the tasks which the children were set, with the suggestion being that they did not fully understand what was being asked of them (Flanagan, 1998). Post-Piagetian research such as that of McGarrigle and Donaldson (1974) has sought to identify flaws in Piaget's theories related to conservation, and here it was identified that when questions were framed in a different way, children in the preoperational stage demonstrated an ability to conserve, which Piaget formerly suggested they were unable to do. Furthermore, studies have also shown that

he grossly underestimated the abilities of children, particularly in the formative stages (Kohler, 2008): for example, he believed that children had no concept of object permanence during the sensorimotor stage (0–2 years). However, studies undertaken by Bremner (1985) and Baillargeon (1991) showed that object permanence appeared in babies as young as three or four months old.

Mitchell and Ziegler (2007) suggest that Piaget's theory requires some modification, observing that the essence of childhood itself has changed, with children reaching both physical and intellectual maturity much earlier now than his theory suggests. Likewise, Flanagan (1998) believes that a more fluid approach to the ages and stages should be applied, suggesting that there is no abrupt change in a child's capabilities at each stage. Rather, there is some degree of crossover between the stages, with aspects of the next stage being achieved while the child is still in the preceding stage.

Perhaps the main flaw in Piaget's work, practically speaking, is in his assertion that a child learns best in isolation, and while this is indeed a mode of learning encouraged in some settings, research and modern education practice advocate a less formal style of teaching, with children learning in groups, supported by the intervention of the adult or more knowledgeable other in the room. More will be said of this in the following section of this chapter.

APPLYING PIAGET IN THE CLASSROOM

Piaget never intended his research to be directly aimed at education (Jarvis and Chandler, 2001); however, it is fair to say that his work has influenced American preschool programmes for over thirty years (Mooney, 2000), while in England, following the highly controversial Plowden Report (1967), primary school teachers began to apply some of the Piagetian principles in their classroom practice – a legacy which has endured to the present day.

Prior to the Plowden Report a typical primary school classroom saw children sitting in rows, learning by rote, with the assumption that all children had the capacity to learn in this way, and those who could not frequently found themselves left behind or, worse, punished. The Plowden committee, then, was set up to examine primary education and look for ways of improving it. Their investigations led them to explore the work of Piaget, and when compiling their report, aspects of his work were incorporated into their recommendations, resulting in a shift from a didactic form of teaching to one which put the child at the centre.

The three main messages from the Plowden Report made implicit that:

- Children need to be given individual attention and cannot all be treated in the same way.
- Children should not be taught things until they are developed enough intellectually to cope with them.

- Children mature intellectually, physically and emotionally at different rates, so teachers should be aware of the stage of development each child has reached and treat them accordingly.

(Jarvis and Chandler, 2001: 142)

Piaget's stage theory can be seen reflected clearly through these recommendations, with the recognition that children mature at different rates and that the teacher should account for this when facilitating learning. This was a significant move from the previous 'one size fits all approach'.

The Plowden Report also placed an increased emphasis on the role of play and discovery learning, stating that:

> We know now that play – in the sense of 'messing about' either with material objects or with other children, and of creating fantasies – is vital to children's learning and therefore vital in school. (1967: 193)

Piaget was a firm advocate of the importance of play as a vehicle for learning, suggesting that it is through their symbolic play that children make sense of the world around them, understanding how things work and what they are for (Mooney, 2000). Likewise, discovery learning was an important aspect of his theory, referring to children as little scientists, who develop as a result of their interactions with the environment; this too was a key theme of the Plowden Report, suggesting that '[the report] lays special stress on individual discovery, on first-hand experience and on opportunities for creative work' (1967: 187).

The direct impact of the Plowden Report was short-lived, due to some hostility from the Labour government which came into power in 1976 and also some well-documented extremes in school practice for which Plowden was blamed. This led to the suggestion that the report had encouraged some undesirable trends, which far from improving the state of education had led to an actual decline in standards. While this resulted in an immediate change in education policy, to an outlook which was more focused on the curriculum, it was heartening to see that in developing the curriculum many of Piaget's principles championed by Plowden were reflected, and indeed were also present in subsequent curriculum developments.

The most significant influence that Piaget's work has had on the curriculum is through the acknowledgement that children have different intellectual capabilities at different stages of their development; as such, the post-Plowden curriculum saw an increased focus on what should be taught to different age groups, with a specific focus on four age stages. These stages were embedded into practice following the Education Reform Act (1988), which saw the introduction of the National Curriculum in England, Wales and Northern Ireland. The National Curriculum presented content to be taught in four distinct blocks of years which were referred to as key stages. Reflecting Piaget's stages of development, the key stages were as follows:

- Key Stage 1 – 5–7 years
- Key Stage 2 – 7–11 years
- Key Stage 3 – 12–14 years
- Key Stage 4 – 14–16 years

(Gov.UK, 2021)

This was subsequently followed by the introduction of the Early Years Foundation Stage in 2008, which saw a specific focus on the standards for the care and education of children in the 0–5 age range.

It can be seen then that the primary curriculum recognises the importance of making the transition from preoperational to concrete operational thinking, with Foundation Stage and Key Stage 1 offering children opportunities for play and discovery as a key vehicle for learning, while at the same time facilitating learning experiences which recognise the child's stage of development and support them in moving to the next. At Key Stages 3 and 4, when children should be in the formal operational stage, the emphasis should be on activities which involve abstract reasoning, allowing pupils to demonstrate their concrete thinking.

A further legacy of Piaget's influence on the Early Years Foundation Stage curriculum is its child-centred nature, a feature which has remained central to the many iterations of the curriculum since it was first introduced in 2008. Of course, Piaget was certainly not the first to encourage a child-centred approach to early years education since such approaches had previously been posited by the likes of Rousseau, Pestalozzi and Froebel (Halpenny and Pettersen, 2014). However, his influence lies in the formalisation of a curriculum which puts children at the centre, with the most recent Early Years Foundation Stage curriculum stating that 'every child is a unique child, who is constantly learning and can be resilient, capable, confident and self-assured' (Department for Education [DfE], 2021: 6). The acknowledgement of each child as a unique being, with their own needs and interests, certainly reflects Piaget's notion that the child should be the main driver of their own learning and encourages a curriculum that allows practitioners the flexibility to plan according to the needs of the child rather than according to a prescribed set of objectives.

A key feature of a child-centred approach is the importance of play, and we have seen previously that Piaget advocated this throughout his stages of cognitive development. Indeed, he suggested that each of his four stages of development could be typified by the types of play which children engage in. While the sensorimotor stage sees children engaged in play that is dictated by their developing mobility, restricted largely to the use of senses and the information gleaned from their immediate environment, it is at the preoperational and concrete operational stage when play really becomes important in supporting children's intellectual development. In the former, children engage in symbolic play, whereby they begin to make sense of objects and people around them, while in the latter stage, children begin to understand the rules

of play and learn that they can alter the rules to change a situation. Play can then be seen to support a child's cognitive and emotional development alongside allowing engagement with problem solving and creative endeavours. Although Piaget did not see a direct correlation between play and early years pedagogy, practitioners and curriculum developers have been mindful that providing the appropriate play activities at the right time can have a direct impact on a child's development. As stated in the Early Years Foundation Stage curriculum, 'play is essential for children's development, building their confidence as they learn to explore, to think about problems and relate to others' (DfE, 2021: 16).

OVERVIEW OF APPLICATION: PIAGET'S IDEAS FOR CLASSROOM PRACTICE

Following are some suggestions as to how Piaget's work might be incorporated into practice.

- Discovery learning – Piaget saw children as little scientists who construct knowledge from their own first-hand experiences. Discovery learning then provides an ideal opportunity for the development of schemas, providing practical experiences for children to assimilate and accommodate information at their own pace.
- Identification of stages of development facilitates the provision of experiences which support developmental stages, for example at the sensorimotor stage children should be provided with sensory materials which enable them to learn through sensory experiences.
- Awareness of stages of development should encourage practice which supports children in making the transition to the next stage, so children in the concrete operational stage may slowly be encouraged to move to formal operations through the gradual removal of support materials.
- Guide rather than teach – adults should facilitate learning, providing experiences and stepping back, allowing children to take responsibility for their own learning, and allowing them to learn from their mistakes, as Piaget believed that learning proceeded through trial and error.
- Focus on the process, not just the product; highlight and commend each stage of the learning process as it occurs.
- Encourage and facilitate play appropriate to the age and stage of children; for example, at the concrete operational stage children can be encouraged to play games with rules which also supports their moral development, while at the formal operational stage it may be pertinent to encourage children to invent their own games with rules.

SUMMARY

We have seen that some aspects of Piaget's theory have been called into question, particularly when considering the methods he used to develop his theories. Yet it is a testament to the conviction in his work that many of his theories have stood the test of time, which makes him undoubtedly the best-known child development theorist of the twentieth century.

Prior to the evolution of his theories those working with young children merely assumed that the child thinks much the same as the adult, the only difference being that the adult has more knowledge on which to base their thought. Piaget was responsible for reversing this view and, rather than assuming that intellect develops gradually as the child matures to adulthood, he demonstrated that thought actually develops through a series of stages, with each stage having its own unique characteristics in relation to the development of thought.

Piaget's stage theory has inspired and influenced curriculum developers and practitioners for over fifty years, and we can still identify areas of the modern-day curriculum which reflect his work. While his stage theory can be seen through the modern-day key stages, his writings on the role of play, the environment and role of the teacher are also reflected in our primary schools today. This in itself is noteworthy but made even more so when we consider that he trained as a biologist, having no formal qualifications in psychology.

It is without a doubt that Jean Piaget was a remarkable individual, and it is through his theories that practitioners today are able to view children in an entirely different way than previously, thereby providing them with the support and guidance appropriate to their age and stage of development.

GLOSSARY OF TERMS

Accommodation

Piaget saw accommodation as part of the adaptation process, in which the child adapts an original schema in order to make sense of a new experience. New schemas may also be formed as part of the process of accommodation.

Adaptation

Piaget saw adaptation as being a key element in the process of cognitive development. Adaptation refers to the process of learning through adjusting to new information and experiences and can proceed through either assimilation or accommodation.

Assimilation

Assimilation is the ability to take in new experiences and information, making sense of this through relating it to existing schemas. Piaget observed that the ability to assimilate was not always seamless in children, and where experiences did not fit comfortably into an existing schema then it was necessary to apply the process of accommodation.

Cognitive development

Cognitive development refers to a process of development which includes intelligence, conscious thought and problem-solving ability. Starting at infancy Piaget believed that cognitive development occurred through the two processes of adaptation and equilibrium.

Concrete operational

The third stage of Piaget's cognitive development theory. He theorised that this stage occurred around middle childhood and was typified by a child's growing ability to develop logical thought. The child's thinking also becomes more organised and rational at this stage.

Conservation

Piaget believed that children understood conservation when they could recognise that a quantity remains the same even if its appearance has changed. One of his most well-known experiments involved showing children two identical beakers containing liquid. Once the children had agreed that the beakers contained the same amount of liquid he then poured the liquid from one into a smaller wider beaker. Children were then asked if the two containers still contained the same amount of liquid. Children not at the conservation stage would believe the smaller beaker to contain the least liquid due to the water level being lower. Piaget discovered that children began to understand the concept of conservation at around seven years of age.

Disequilibrium

Disequilibrium occurs when children are unable to apply an existing schema to a situation or event; this causes an imbalance between what is understood and what is encountered, which can only be resolved through developing a new schema or adopting old ones until balance is restored.

Egocentric

This is a stage of development in which children are unable to see things from the point of view of others; the child will assume that others see, hear and feel things in the same way as themself.

Equilibrium

When a balance between accommodation and assimilation is struck children achieve a state of equilibrium. Piaget suggested that this occurred through the process of equilibration in which children use existing knowledge to make sense of new knowledge. This is seen as an important stage in their development.

Formal operational

The final stage of Piaget's theory, occurring from twelve years upwards. At this stage children can apply abstract thought to a situation and can use logic and deductive reasoning to solve hypothetical problems. Piaget also believed that at this stage children developed moral, ethical and social awareness.

Preoperational

Occurring in early childhood (two to seven years), this stage of development is typified by egocentricity. Children are, however, developing language and thinking skills, although thinking is still at a concrete level. Piaget observed that children learn through pretend play and can use words and pictures to represent objects.

Schemas

Schemas refer to the stages of intellectual growth which children go through. Piaget believed that they developed schemas through their interactions with the environment, as they take in information and learn new things. Schemas are constantly modified or changed as new experiences happen.

Sensorimotor

The first of Piaget's stages of development, occurring from birth to two years. At this stage children rely on their senses to make sense of the world and learn through basic movements such as sucking, grasping and listening. At this stage they have no concept of object permanence, believing that if an object has been removed from sight then it ceases to exist.

FURTHER READING

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