Vision versus reality in a multi-age class from an international perspective

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Abstract
The prevailing assumption is that a multi-age learning environment allows the learner to interact with a wide range of students, representing a broad range of cognitive, emotional and social aspects depending on the individual development of each student. Focusing on the school vision of a multi-age elementary school, this study compares and contrasts two models, one Austrian and one in Israel. Firstly, the study presents the views and actions of the students, teachers and the administrative team to better understand the benefits and challenges of the multi-age classroom. Secondly, the study examines the emotional, social and cognitive characteristics that define multi-age education and thirdly, it looks at the teaching and learning processes that are derived from this structure and the connection with significant learning. This study used qualitative research methods (case studies) and triangulation of participants and research tools.

Introduction
Most classrooms around the world are divided into single-age classrooms. The multi-age learning model holds that combined-age classrooms more closely reflect the real world. In a child's natural environment there is no precise differentiation between people according to

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age. Therefore, it is logical for children of different ages to work together. Central to this concept is the idea that every person develops at a different rate. A multi-age classroom enables the student to interact with a wide range of learners representing a broad range in the social, cognitive and emotional realm depending on the individual development of each child. A multi-age learning environment can better prepare students for life by cultivating social relationships and developing positive communication and social skills (Aina, 2001; Anderman & Anderman, 2010; Bergmark et al, 2014; Frosco et al, 2004; Gaustad, 1995; Kinsey, 2001; Pardini, 2005; Sanchez & Kaplan, 2014; Sims, 2008; Song, Spradin & Plucker, 2009). We explore the perceptions and feelings of the students, teaching and administrative staff and how they relate to the vision and the rationale inherent in the multi-age learning environment, recognizing that the realization of the vision of a school learning environment is largely dependent on the individuals.

The Theoretical Rationale for a Multi-Age Learning Environment

The influence and guiding principles of the French Revolution, making education a democratic right for all, followed by the Industrial Revolution gave rise to the educational systems that we know today. Education for the masses based on principles of production assembly lines organized children into age-matched groups (Goodlad and Anderson, 1963). As the 19th century model of education took hold with pupils grouped in classrooms according to chronological age, educators, led by John Dewey, warned of neglecting individual and social needs, and called for a holistic view that puts the child at the center. A new, constructivist learning theory called for the reorganization of curricula content (Aina, 2001; Anderman & Anderman, 2010; Gaustad, 1995; Ruesch, 2012; Sanchez & Kaplan, 2014; Sims, 2008). Piaget’s theory regards the child as an active learner and sees learning as an active process of knowledge building (Von Glaserfeld, 2008). In addition to Piaget's theory is Vygotsky's socio-cultural theory (1978), whose fundamental premise is that cognitive development is also a result of the combination of spontaneous development together with his or her social and cultural interaction. According to Vygotsky, a child's cognitive development is accomplished by moving from the level of development of his or her current intellectual functions to a zone of proximal development (ZPD) representing the level of functions in the process of maturation (Twomsey & Perry, 2005). Hence, the social
environment is critical to learning (Schunk, 2000). In heterogenous groups where students with lower ability are exposed to the higher ability level of their peers, they are able to progress to a higher development stage. This exists to a lesser extent in a class of uniform level. Montessori refers directly to multi-age learning (Montessori, 1964). This approach holds that there is not necessarily a correlation between the learner's chronological age and the "developmental age", so the learner should be allowed an educational environment tailored to his or her physical and spiritual development (Montessori, 1995).

Research on Multi-Age Learning

Anderson & Pavan (1963) present multi-age classrooms as a way to manage the reality of individual variation that exists between students in the classroom. Differences that exist in every classroom should not be ignored or eradicated by organizational systems. Studies in the field flourished in the 1980s and 1990s and researchers continue to explore multi-age learning around the world. Multi-age education is consistent with the latest theories on learning and cognition and the social and technological transformations taking place in this current age (Aina, 2001; Anderman & Anderman, 2010; Bergmark et al, 2014; Harmon, 2001; Kasten, 1998; Miller, 1993; Pardini, 2005; Sanchez & Kaplan, 2014; Sims, 2008; Song, Spradin & Plucker, 2009). Research shows a contribution to the emotional-social aspect in the multi-age classroom, but it is not possible to conclude unequivocally about the influence of multi-age learning on student achievement. However, some claim that research in the field is still in its early stages, and the research literature is limited, anecdotal, and of poor quality (Kinsey, 2001; Mulryan-Kyne, 2007). This is due in part to the multitude of concepts in the literature to describe multi-age classes, such as multi-age, mixed-age, combination-class, and dual-age. This leads to confusion in understanding the research. Veenman (1995) warns of this and makes a distinction between nongraded schools created for organizational-economic reasons in rural areas where the number of children is low, compared to multi-age schools that were purposefully founded to create an organizational structure that invites learners with a variety of developmental ranges. Another distinction is made between combination classes created for logistical reasons, such as a drop in school enrollment, where students from two or more classes connect together without the infrastructure and support they need, and the multi-age classes based on a philosophical-pedagogical rationale taught by a team of educators with the focus on and provision of tailored content (Mason & Burns,
1997; Mulryan-Kyne, 2007; Veenman, 1995). Mason and Burns (1997) add that research in the field suffers from a methodological problem due to the fact that the quality of teachers and students is often higher in multi-age classrooms giving them an unfair advantage. Veenman (1995) adds that there are no studies in which students were randomly assigned to an experimental and control group, which calls into question the quality and reliability of the studies. Due to these weaknesses, it is difficult to draw unequivocal conclusions regarding the benefits of multi-age teaching-learning processes.

Methodology

The Purpose of the Study

This study aims to understand and define the multi-age vision and structure from the perspective of students, teaching and administrative staff in one school in Austria and one in Israel.

Research Methods

This study was conducted within the constructivist-interpretive paradigm, a qualitative approach that focuses on participants (Shkedi, 2003). The study focuses on examining unique events of which there is insufficient information in the research literature (Kinsey, 2001; Mulryan-Kyne, 2007). This methodology assumes that reality is constructed by humans through the creation of a subjective interpretation of their experiences (Shkedi, 2003). The choice of methodology was made to monitor emotional, social and cognitive processes derived from teaching-learning processes in the two models. These changes take place on a personal level, where participants and their personal experiences are placed at the center (Shkedi, 2003). This study was conducted using a case study method to allow a closer look into the research arena and to understand it as a social and cultural complex, (Yosifon, 2001, pp 266), combining the instrumental and collective case study. It treats each of the participants as an individual case, with a view of understanding the significant learning experience from their own inner world, and at the same time everyone as a holistic, unique group (Stake, 2000). Attempts to point out similarities and differences were made by
categorizing data collected and finding themes in both the Austrian and the Israeli model (Guba & Lincoln, 1994).

**Research Questions**

1. What is the school structure, vision and rationale in the two school models and how are they perceived by students, teachers and the administrative team?
2. What are the emotional, social and cognitive outcomes of the teaching-learning processes in the multi-age classroom in the two models?
3. What are the teaching-learning methods derived from the multi-age learning environment and how does it relate to significant learning from the perspective of the students, teachers and administrative staff working in the Austrian and Israeli model?

**Field Research**

The study was conducted in Austria and Israel. The elementary school in Israel was chosen to serve as an experimental school on behalf of the Ministry of Education’s Research and Development Department, with the aim of encouraging leading educators to develop innovative pedagogical models and create the infrastructure to implement these ideas through a network of experimental schools across the country. Multi-level classes have existed in Vienna / Austria since 1998 and are represented in many vocational schools. In Austria, two multi-level classes took part in the study, one in a public (state) elementary school and one in the practical school of the Private Pedagogical University Vienna / Krems. The principle of age heterogeneity is used in these classes as “child-appropriate and scientifically recognized form of contemporary learning”.

**The Study Population**

The population under study are the three schools, two in Austria and one in Israel. In the Israeli school, the multi-age structure is divided into two age-groups ranging from Grades 1 to 6. Grades 1 to 3 make up the younger age group with Grades 4 to 6 forming the older age group. A representative sample of different positions was selected from the school and administrative staff in order to provide different perspectives and to triangulate the participants to enrich the data and validate the research findings. Among the students, a
representative sample was selected from the younger and older students in different positions on the continuum to understand the differences and provide triangulation of data with the aim of enriching and validating the findings of the study. The study population included 80 participants: 11 teachers, 6 administrative staff and 63 students participated. The student population was picked from both the younger and the older age group.

In Austria, the study included 52 participants. These consist of the two directors of the two schools, 4 teachers and 46 students. The age of the pupils in both classes is between 6 and 11 years and includes the primary school levels 1 to 4 prescribed by the Austrian school system. In both classes of the study, the school levels are relatively evenly distributed, so that approximately each of the four school levels (1st to 4th elementary school) have the same distribution. Thanks to the reform pedagogical concept, it is possible in the multi-level classes that pupils (one pupil per location) skip a class (talent model) or also have the opportunity to spend five years in the class (three pupils).

Research Tools
The data collection tools, accepted by the qualitative approach, are listed below:

Observation
The observation was conducted in the 'mixed observation' style: pure and participant observation. The study population was observed during various classes and informal hours (recess, workshops, classes and meetings). Observations were recorded in the research journal.

Interviews
The interviews were conducted individually with all participants in the study and were a significant tool in the dissemination of information. The interview was built on Patton's (2002) model in which six sets of questions were asked on topics of experience and behavior, opinions and values, emotions, knowledge, senses and demographics and helped obtain information from six categories to provide a broader perspective of the interviewees (Patton, 2002). The interviews are semi-structured according to the guided and focused system of interviewing (Yosifon, 2001), where the topics are pre-defined, but the formulation of
questions and the order of the topics are subject to change, according to the dynamics of the conversation (Seidman, 2013). This type of interview allowed respondents to respond freely, while allowing the researcher to have a frame of reference for points that arise during the interview.

**Research Journal**

The research journal was used as a tool to record observations and events as well as to record ideas, questions, and points raised by the Austrian and Israeli field research.

**Documents**

Documents from all the schools: website content, school vision and mission statements, school charter, curriculum and e-mail correspondence.

**Data Analysis**

The diverse research tools provided a wealth of data and were selected from the observations and interviews, including representative cases taken from case studies. The qualitative data were collected from the observations and interviews and analyzed according to the method of analysis (thematic analysis), using text snippets and not just words and phrases. In this way, a broad and rich picture of the interviewees' words was created, which is not detached from the context in which they were spoken and refines their interpretation. The analysis was carried out in five steps (Shkedi, 2003):

1. Initial coding: the distribution of interviews into descriptive categories.
2. Mapping analysis: an in-depth analysis of all interviews, locating nuclear categories, and creating subcategories.
3. Focused analysis: gathering the categories into the most significant super categories.
4. Descriptive analysis: present descriptive narratives, which give a focused look at the factors that influence curriculum change in a multi-age classroom.
5. Theoretical analysis: connecting the case studies to a joint discussion with the research literature.

**Reliability and Validity**

In order to validate the findings and increase their reliability, the research set includes the following components:
Triangulation of information source: students, teaching and administrative staff. Triangulation of research tools: observations, interviews, research journal and school documents. The findings were collected concurrently in Austria and Israel throughout 2020. Uniform information was collected for all participants, enabling comparison of fixed metrics, such as: looking at the same subjects and different groups, the starting point of participants and the participants' actions and ways of dealing. To reduce the research bias and to validate its findings, continual attempts were made to examine the interpretation with participants during the interviews and conversations, and to back up the findings with diverse quotes from participants' words, in order to increase interpretive validity.

Research Ethics
Informed consent was given by all study participants in Austria and Israel and confirmed by the researchers observing in classrooms. Names were changed to protect the privacy and rights of the participants. Permission to conduct the study was given by the Chief Scientist in Israel as is customary in the field of research involving students. In Austria, the study is submitted to the Institute for Research & Development at the Private University of Teacher Education Vienna / Krems and is evaluated there as part of the quality assurance measures.

Findings
This study presents two models of multi-age schools in Austrian and in Israel. In this part we discuss (1) the similarities and differences in the structure, vision and rationale for the two schools. (2) the emotional, social and cognitive outcomes of the teaching-learning processes in the multi-age school in Austria and Israel. (3) the teaching-learning processes that are derived from the multi-age structure in connection with significant learning in the Austrian and Israeli model. Our findings represent the point of view of the students, teachers and the administrative staff operating in Austria and Israel.

The School Structure - Rationale and Vision Vis-à-Vis Reality in Austria and Israel

Structure - Vision and Rationale in the Austrian and Israeli Model
The central vision of the Israeli school is to realize individual potential and act according to the principles of democracy, while fostering values of caring and responsibility for
humankind, society and the environment. The vision of the Austrian school model shares similar values in terms or recognizing individual development. It questions the model of single age classrooms, replacing it with the multi-age structure that mirrors a family model comprised of older and younger classmates, in which every single child is integrated and finds support and security. Documents from the Austrian and the Israeli schools share the belief that the multi-age structure provides exposure to different levels of thinking, different learning environments, and a diversity of learning materials. The Austrian model recognizes that the heterogeneity of ages leads to an automatic creation of individual care and allows the child to find the learning environment that suits the current learning process and their individual needs.

In the Austrian model, talented children can graduate from elementary school after 3 years, for children who need more time for their development, 5 school years are available. The Israeli school states that a diversity of learning processes enables growth and development over time and creates a rich and complex learning environment that can accelerate classroom learning processes. The importance of social roles and responsibility is evident in the vision of both the Israeli and the Austrian schools. They share how the dynamics of the multi-age structure offers students a variety of experiences and roles in their varying educational and developmental stages. The students grow into a group right from the start and take on various roles and tasks simulate life at home and out in the real world.

Teamwork and peer instruction are benefits that both school models value and encourage both within the classroom and during social activities and interactions. As the Israeli model makes clear, this facilitates significant learning in the learner’s zone of proximal development. In order to adapt to the multi-age structure, school staff is required to change their approaches and teaching methods. In both schools, there is a team of teachers, usually two teachers, that have the same responsibility for all students in the class. Teacher-centered teaching is replaced by individual support. In the Israeli school model, content and learning materials are adjusted for spiral teaching and a science curriculum was newly created and adapted together with a consultant.
A Reflection of the Rationale by Students, Teachers and Administrative Staff in the Austrian and Israeli Models

The multi-age classroom provides a varied and natural learning environment that allows for students to grow in line with their emotional, social and cognitive state as opposed to their chronological age. The Austrian school vision reveals a conviction that single-age groups hinder free development of children. The vision of the teachers in these classes is to accompany children in their development and to recognize and promote their individual talents and needs. The words of the Israeli school’s principal reflect this thinking:

... there is no theoretical and practical logic to placing kibbutz children by age in classrooms...variety and diversity are an opportunity for growth and leverage for advancement and not a disadvantage and threat ... a variety of ages allowing support, mentoring, cooperation, emotional openness, caring, a sense of responsibility for others...Growth and maturation within the classroom is a process that enables dynamism and experience in a variety of social roles.

This environment offers a variety of social roles for students, that include collaboration, support, mentoring and developing good relationships. In addition, it develops responsibility, independence and leadership among students. One teacher in the Israeli model says:

In a multi-age learning environment, we see the benefits for a child's development and growth ... it allows for growth to always take place...one time I am the one who needs help, then suddenly a year later, I am the one who helps others ... it guides them, leads them. Socially, educationally ...

The words of a student in the Austrian school reflects this collaboration and support:

My friend is 2 years younger than me, but we do the same with arithmetic. For that I can read her from the books during the break (Anna, 3rd grade).

Similar opinions are shared by a student in the Israeli school:

It's fun to learn together ... And there are things you don't like doing alone ... I think it's fun to be with grades 4 and 6, because you can help each other. To connect with children younger than you and those older than you. And I love this method ... (Saar, 5th grade).
As in Israel, the interviews with directors and teachers in Austria show that the multi-level classes also have their justification in the social reality. This is well illustrated in the following statement by a class teacher in Austria:

As in everyday life, the children find different age groups, different cognitive developments and different social backgrounds in these classes. These experiences support them in their further development and map very well the life situation of the children and their families.

Challenges of realizing the vision and rationale in the two models

In the multi-age school, the development of the student is dynamic, as too, is the role of the teacher. The curriculum needs to be adapted to accommodate and cater to the individual development of the student. While many of the staff embrace the vision and the teaching methods, for two on the Israeli staff, it has drawbacks.

It was very difficult for me to understand the rationale behind it. It’s good for the social aspect. The atmosphere in the classroom. But when it comes to the curriculum, there is something lacking, in my opinion... (Saul, teacher of the oldest age-group).

A lack of understanding or alignment with the rationale of the multi-age classroom creates a challenge for these teachers to implement. Overall, the opinions and sentiments of the students, teachers and administrative align with and are in concordance with the vision and rationale of both school models. Both the Austrian and Israeli school vision describes how the multi-age system creates a natural learning environment that mirrors family life with social interactions taking place under these aspects (Bäck, 2008). It also reflects learning in the real world outside of the school environment and interviews with teachers and administrative staff share how they feel the multi-age school better prepares students for life than in single-age classes.

The Emotional, Social and Cognitive Outcomes of the Teaching-Learning Processes in the Multi-Age Schools in Austria and Israel
**Emotional Aspect**

In the Israeli model, the sense of belonging and confidence that the students feel in the school is one of the most significant things that came up when examining multi-age learning in the study. Differences and diversity in multi-age classrooms reduce competition, reduce aggression, boost self-confidence, encourage caring, reciprocity and student support. Combining students of different ages in one classroom creates a caring environment because it encourages older students to act as role models or mentors to younger students (Miller, 1994; Song, Spradin & Plucker, 2009). This is in line with the experience of the Israeli school, where the students, teachers and staff describe a lower level of stress among the students, fewer disciplinary problems, less aggression and a sense of security within the classroom for all the students, both younger and older. In an attempt to examine the reasons for this, two key characteristics became apparent: one is that the student is allowed to feel like an individual in a non-competitive system and the other is that the role of the older students serve as an example to the younger students as they support and help them. This is evident in the words of a teacher in the Israeli school:

> The benefits are really that you are very much about the progression of older children, or even strong 4th or 5th graders. There is very good interaction. Less violence. Less hormones, not all of which are in the same state of development, growth and pressure... I feel it makes everything calmer. Less competition...

Among the students in Israel, a similar thought pattern emerged describing a sense of security and trust that comes from the caring and sincere concern they feel from the team of teachers. Eleanor, a sixth grader, reinforces this claim by saying:

> ... So I want to say that at this school, sometimes I have a bit of a problem with my friends, and any teacher, whoever we want, will get involved and help us. Help us find the best solution so that we can have a happy, calm and pleasant school year... (Eleanor, 6th Grade).

In the opinions of the Israeli staff, there is evidence that they attribute the lack of tension, stress and sense of security among the students to the fact that there is less pressure and competition with regards to the academic aspect, which is a result of fewer tests and grade assessments. In the words of the Israeli school counselor:
"I really see it. For many years I was in the regular education system. And there was a lot more pressure. The tests ah ... the pressure was much greater. The tests create a lot more stress, pressure and competitiveness that is not nearly the same here..."

The shared learning experience is very important in the Austrian model of multi-level classes. The cooperation required to facilitate this strengthens the social structure of the class. The children trust their classmates, so they actively seek support from them when they are needed or they offer this help. An environment that mirrors the family setting, is important for both students and their parents, an interesting aspect that was brought to light in surveys in Austria. Some parents with children with no siblings look to the multi-age school to provide that sense of family that their child may not otherwise experience.

My daughter is a single child. The decision for the multi-level class is also based on the fact that we wanted to give Anna a family-like group at school. So your best friend is like a sister to her (Mother of Anna 8a).

In summary, the Israeli educators and staff embrace the multi-age structure because it reduces stress and pressure on the students that the more competitive environment of a single-age classroom can create. Additionally, both school models praise the sense of support and cooperation that is evident among students in a multi-age classroom.

**Social interaction in the multi-age classroom in the two models**

Multi-age classrooms have shown a positive impact of this approach on fostering social relationships and developing positive social and communication attitudes in diverse societies. (Aina, 2001; Anderman & Anderman, 2010; Bergmark et al, 2014). This concept aligns with the Israeli school vision, which describes the mobility the learner has to move from young, middle to older settings “allows for diverse experiences that support young people and builds up the older students.” The dynamics of the multi-age classroom structure offers students a variety of roles during their educational and developmental stages as they move from being the younger, to middle to older students. Stepping into these roles and taking on responsibility may shape behavior and personality and contribute to the creation of a positive and caring individual and citizen (Kasten, 1998; Kinsey, 2001). The Austrian schools emphasize this student collaboration and the opportunity for students to take on
different roles in their years at school. As a result, many processes of later life can be tested and internalized in a protected environment, as the words of the director of one of the Austrian schools illustrates:

Our students learn that communication and empathy are an important part of life. This can be achieved even better with the multi-level classes.

A review of the literature shows consensus that a multi-age classroom encourages cooperation, helping, acceptance of others and differences, progression, stability and a positive attitude towards school (Harmon, 2001). The views of educators and administrative staff at the Israeli school support the claim that the multi-age classroom has a positive influence on the cultivation of social relations and interactions. As you can see in the following statement, they are of the opinion that the structure allows for diversity and progression over the years:

“Socially, there is a broader range of connections and more opportunities for children to move within the age band...A more mature child in the sixth grade can find commonalities with other sixth-grade children whereas another child, who is less emotionally developed and less mature can find a common language with a younger child who, developmentally, is closer to him.”

From the interviews and observations of the educational and administrative staff from the Israeli school, it is clear the social dynamics between the students occur during school hours and continue outside of school. The words of a student in the Austrian school reflects this idea of the support and collaboration continuing outside of the classroom.

When we play ball games while doing gymnastics, we see that there is always the same number of children from every class level in every team. Then that's fair (Amelie 7a).

The multi-age learning environment in the Israeli model provides fertile ground for social interactions across a wide range of age ranges that are based on mutual caring, assistance and shared interests. The latter are the glue linking the students, irrespective of the student's age. Multi-age gatherings occur outside of the classroom when there is a shared interest, as one special education teacher in the Israel school points out.
Shalom et al.

I see the continuation of this outside of the classroom. Socially, I mean. At breaktime, I walk around and see kids of all ages playing ball together. In the school yard, young children will turn to older ones. They see them as someone they can turn to, other than just the adults.

The students painted a similar picture depicting social interaction between the different age groups. As a student in the Israeli model says:

...I have kids that I know from second grade, there are some also from first and third grade... from second grade, I have Oriana and Monica and from first grade, I have Gali and from third grade, I have Ruth... (Esther, 2nd grade).

The Austrian model helps students transition from kindergarten to elementary school. Multi-age schools in Austria are - with a few exceptions - limited to Primary Schools with the age range being from 6 to 10 years old. Before that, the children have at least one compulsory kindergarten year. While the kindergartens in Austria basically have family groups, the elementary school classes are age-homogeneous classes.

Switching from kindergarten to school was easy, Anna also met a friend who was 1 year older from her preschool group. This is a great advantage of the multi-level class (Mother of Anna 8a).

The idea of the multi-level classes facilitates the transition from kindergarten to school. The children find themselves in a multi-year class form again. In this way, early role experiences from kindergarten can also be transferred to school and further developed. However, this positivity about students’ transition is not felt to the same extent in Israel. There, the educators have concerns about how to prepare the students for transition to a single-age school middle school. Part of this is due to the lack of uniqueness felt by the older children in Grade 6. It is harder to identify them and help them transition.

The downside is that each age-group has a limited number of children ... Each age has its own status ...

The 6th-grades themselves share this sentiment. They feel less unique, even though some of the activities are adapted to their needs. The sixth-grade students do get the feeling of being the older students through some of the activities that the school has adapted to their needs.
but the results are varied. Some students do not feel this lack of uniqueness that the educational and administrative staff voiced; some find that the unique content tailored to them is enough; and some feel a desire to be part of a group of students who are the same age and that it is not enough for them. The variety of feelings is evident in the words of the students:

Here I feel more 'respected'... here you feel special, you feel great. You have many more projects. Tasks that are just for sixth-graders... mentoring or projects... And sometimes it's not fun, because you only want to be with your age-group, only with the sixth-graders.

Cognitive Interplay in the Multi-Age Classroom in the Two Models

Vygotsky (1978) argues that development occurs through social interactions, during which a person more skilled from the same cultural group acts as a mentor and imparts knowledge to one who has not yet acquired it. Heterogeneous groups allow less-able students to be exposed to higher levels of thinking by their peers, thus increasing their zone of proximal development, something which exists to a lesser extent in a class where students are the same age (Mason & Burns, 1997; Veenman, 1995). The benefits of the inherent advantage of peer learning in a multi-age classroom has is recognized by educators and students alike in both Israel and Austria. And an Israeli teacher notes:

...the educational roles here allow you to be the one who receives and learns from other children who are role models, until you become the one who sets the example and they learn from you...

The young student learns and progresses, while at the same time the older student gains a 'sense of empowerment'. One student in Israel described the good feeling she got from helping her younger peers:

... Even when I get older, I feel a little better honestly, because I can help more kids ...
It's a good feeling that kids need you ... It's very, very fun. ...

The tutor system that the multi-age classroom enables allows for mutual support between students, with the Austrian school recognizing that this removes the focus away from the age
of the student on to the competence of the individual and on the promotion of talent - although talent should not be seen as a gift here. The child-centered approach enables the children’s talents to be recognized and promoted much better (Busch, 2006). At the same time, deficits are recognized as such and can be compensated within the group through specific support. Through this concept, the learner experiences himself as a self-directed being who learns independently in the class. Independence is promoted through self-employment (Herker & Wiedner 2010).

I can organize my learning myself. I have a weekly schedule so I know what I have to do in this 5 days. And if I have any questions, I go to my classmates first and only then ask our teacher (Davis 10a).

This independent learning also promotes the development of new content through research-based learning. This can be done by independently developing content from books or digitally in the media (a very helpful skill in times of COVID19), or by discussing with other children in the class and accessing content that has already been acquired. Students in Israel also emphasized the importance of personal advancement based on individual abilities and needs as well as a desire to get help from their friends as well as from the teachers. For one teacher in Austria, adapting to peer learning took some time in the beginning as they were forced to reconsider their role:

In the beginning it was quite difficult to accept that as a teacher that I am not at the center of the class, but had to take on the role of a mentor more strongly" (Class teacher).

The individualized learning, however, can present challenges for the educational staff. In Austria, the multi-age class is led by a class teacher who teaches all subjects except for religion. Depending on the school and available resources, there is a team teacher for 8-12 hours a week. In the Israeli school the teachers follow a spiral curriculum, spaced out over time, with not textbooks. The curriculum and skills are built and adapted by educators in a variety of styles and levels. Creating a diverse and wide-ranging learning environment of this kind requires a great deal of preparation to personalize the curriculum to match the varying levels of the students.
In terms of learning, of course, there is the range of materials ... The structure actually “forces” us into developing materials that are for a wide age range ... There are six levels even ...

You have to create a very flexible class schedule. And ... every lesson needs to be planned to suit everyone ...

For most teachers in Israel and Austria, creating this kind of learning environment is important and they believe in the contribution and benefits of this method to meet the individual needs of students. Even though it presents challenges, they acknowledge the importance of the preparation required for the multi-age class. However, two teachers from the Israeli school were not able to see the contribution of the multi-age structure and brought up the difficulties in adapting the content and skills in the multi-age classroom. As an educator in the Israeli school describes:

... how do we get it to suit everyone ... I have a problem with it a little bit. I feel useless. I feel worthless... and sometimes I feel like I am not as good as I was...

They found it difficult to adapt content effectively to the various age ranges and felt that they were missing something. Through the individual planning of the weekly plans for each child, there is also a targeted support. However, the interviews with teachers and directors in Austria show that the specifics of the Austrian curriculum that need to be adhered to, can present an obstacle to individual support.

Unfortunately, we cannot easily judge our children according to their individual developments, since we still have the curriculum as a reference standard and this dictates what needs to be learned in which school year or at which school level (Teacher).

However, the presence of the second team teacher in the Austrian class, allows for intensive supervision of small groups, which allows the teachers to more easily recognize if a child has problems with processing. This enables individual learning loops to be built in or the support of other students to be included.

The Teaching-Learning Methods in the Multi-Age Schools in Austria and Israel and How They Relate to Significant Learning.
Central to the concept of a multi-age learning environment is the idea that each person develops at a different pace, reaching different development states that is not directly linked to age. The teachers are tasked with designing a learning environment in class that caters to the variety of students in each class. A strong focus is placed on independent learning, peer-supported learning and research-based learning with learning models such as Montessori serving as a guide. A teacher in the younger tier describes the “Montessori Spirit”:

... Montessori’s spirit and her philosophy keeps coming into the classroom…it is in the learning aids themselves…also in the teaching, the exercises, what comes after. Taking on a task, returning it, taking into account the child who would come later to take on the task. What I mean is, the work cycle is often based on the way Maria Montessori worked. And we’re not really a Montessori class ...

Adaptive Teaching in the Two Models

Adaptive teaching addresses student differences and places the learner at the center of the learning process. (Rocco & Whalen, 2014; Soslau, 2012; Vogt & Rogalla, 2009) In order for the teaching-learning processes to be tailored to the individual, the ways a student learns best need to be identified through exploration and discovery. This requires a connection between the student and the teacher. Both the Austrian and the Israeli recognize the importance of the emotional bond between teachers and students in the multi-age class. The Israeli model points out the benefits of having two teachers, which allows them to be able to tailor the learning processes compared to single-age classes where there is only one teacher. Two teachers allow the student to choose someone with whom he/she 'connects' and feels comfortable with depending on the context:

... There are good things about both of them (the two educators in the classroom). She (the teacher) always knows how to listen to you and talk to you and everything. And he (the teacher) always makes you laugh ...

As in the Israeli model, every single child in the Austrian multi-age classes is the focus of the pedagogical activities. A development plan is drawn up individually for each child, which is then incorporated into a weekly learning plan, which is essential but not without challenges.
The preparation of the weekly schedule is very time-consuming because I have to take into account the development status of each individual child when planning. It also depends on which materials to support the learning process I have to prepare in the class (Class teacher).

The Learning Environment in the Two Models

Both school models are characterized by a variety of content, teaching aids and supplementary materials in many different learning styles. This is consistent with Piaget's (1974) theory of the learning process as a direct function of the child's encounter with objects or information in their environment, which creates cognitive conflict in line with the neurological maturity of the developmental stage the child is in. The learning environment, both inside and outside the classroom, is wide in range in both the Austrian and the Israeli model. The student chooses the subject or study materials, the amount of time they spend learning it, as well as the classmates to work with. In this way, educators believe that students are able to discover the way they learn best, resulting in optimal learning. (Song, Spradin & Plucker, 2009). As one of the Israeli teachers says:

We allow choice. About what to study. There are some who need to read a book in the morning and then work. Some enjoy doing maths in the morning. There are those who need to eat first and those who need to eat during, to eat and drink.

This variety and freedom of choice are also reflected in informal learning that takes place in extracurricular workshops and classes available to students both in Austria and in Israel, with an emphasis on art and sport. The learning environment offers a wide range of options and content to tailor to the students' abilities, tendencies, desires and needs. Additionally, the skills they acquire are important for the students not only later in life but that can also benefit them in different learning environments, to which one Austrian mother attests:

Our older daughter has been in high school for two years now, but the things she learned here in the multi-level class still benefit her (Mother of a former student whose sister is now attending the MSK).

Peer Learning in the Two Models
Peer learning involves teamwork, collaboration, social interactions, and may have a significant impact on learning and bringing about better academic, social, and emotional achievement for students. In a classroom setting where students are of varying age ranges, discourse and dialogue between learning partners are key to active and meaningful learning. (Dobbins, Gagnon, & Ulrich, 2014; Kagan & Kagan, 2009; Kinsey, 2001; Stone, 1996; Tsai, 2014) Peer learning allows students who teach to share a language because there is a common denominator among peer students, who are empowered to teach others.

The benefits are that children teach children. It empowers both the children who teach and those that learn. But even more so for children who teach. It’s very empowering. Even a child who is not as able as we said before … It may be that a sixth-grader, who is less able than a fourth-grader, takes on a teaching role that greatly empowers him ... (Principal of the Israeli school).

The students illustrate again and again how peer learning is a significant experience that empowers them with personal, social, and cognitive aspects of formal and informal content:

I think, really, it's a great idea. Everyone basically learns from each other. The big ones help the little ones, sometimes the little ones help the big ones ... study, work together. There are many more friends this way ... I have lots of friends who are much younger or older ...

These remarks indicate that peer learning is not necessarily related to the learner's chronological age but to their abilities, skills and inclinations. Peer learning allows both younger and older children to acquire a broad circle of friends who learn formal and informal content together. In addition, peer learning helps in the development of discourse between learning partners and promotes active and meaningful learning (Aloni, 2014). Another point that emerges from the students' words is that they are able to demonstrate their strengths to the other students, which contributes to a positive sense of empowerment.

Conclusion

The multi-age learning model holds that combined-age classrooms more closely reflect learning in the real world. Both the Austrian and the Israeli school vision describes how the
multi-age system creates a natural learning environment that mirrors family life and its social interactions. This is reflected in the words of both students and staff as they often refer to the school as family. The multi-age model allows for a child to develop at their own pace and promotes their individual talents and needs. The students and staff in both schools voice their appreciation for this natural learning environment that acknowledges the individualism of cognitive and social development. Furthermore, the teaching staff comment on how there is less pressure, stress and competition in the multi-age classroom compared to their experiences teaching single-age classes.

Implementing the vision and goals of the schools pose challenges for the educational staff, especially when it comes to personalizing and customizing learning plans and adapting learning material. In the study, we see that the more aligned the staff are with the vision, the easier it is for them to cope with these challenges. Many welcome the stronger connection and rapport they have with the students that is required to cater to the individual development of each student. In both models, there are two teachers to accommodate the increased focus on the individual and to make sure their needs are being met. Students point out that this is a positive benefit as it gives them a choice of who to ask for help depending on their particular needs. The interviews with the students in both school models reveal few challenges and many benefits. The students welcome the natural learning environment. Many students talk about the benefits it confers on them, in particular, the opportunity for them to take on different roles at different times. A student can be a learner and a teacher to other students; roles that depend entirely on their own skills and knowledge and not related to age. The teaching staff in both models recognize the importance of this in boosting self-confidence.

For some older students there is a reference to feeling less unique, in particular among the ones who are about to graduate. The teachers recognize this lack of status that is typically afforded graduating students in single-age schools and while they try to create programs and events to address this, they feel something is lacking.

Both school models reveal a large variety of teaching-learning methods that are derived from child-centered, tailored teaching-learning. Multi-age classrooms address individual
differences among students in classrooms and lead to a wide range of learning and learning styles alongside a variety of formal and informal content, where the student has freedom of choice. Peer learning occurs naturally regardless of the student's chronological age and is based on abilities and skills. Peer learning frees up teachers for focused instruction either one-in-one or in small groups adapted to the students' needs. While the school models are not specifically Montessori schools, this approach is applied and permeates the classroom experience, particularly in the Israeli model.

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