



Learning - the Israeli Way: Key Educational Experiences and Classroom Noise

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Authors' contributions

This study was carried out in collaboration between the two authors. Author GY designed the study, developed the theoretical model and made the pilot studies. He was also responsible for collecting most of the data. Author GP-G collected supplementary data and made the analyses for this paper. Both authors read and approved the final manuscript.

Research Article

Received 16th March 2013
Accepted 23rd May 2013
Published 3rd June 2013

ABSTRACT

Aims: The present study exposes that meaningful learning experiences in Israeli schools take place in noisy and highly active classrooms. In contrast to common assumptions, we show that significant learning takes place in "active" classrooms, where "activity" reflects students' enthusiasm, curiosity and interest.

Place and Duration of Study: The study took place in Israel and collected evidence along three years.

Study Design: The study used a convenience sample of adults who reported about their strongest educational experiences in life. The sample proved representative of Israeli high school populations. The present article is based on the analysis of 483 retrospective key educational experiences that adults had during their school days.

Methodology: We used interpretive methods to analyze major themes and patterns but also coded experiences in order to assess the quantitative ecology of "noisy" experiences in school.

Results: A thematic qualitative analysis of the episodes shows that key educational experiences occurred when the content of instruction was authentic, relevant and challenging. Key experiences also reflected teachers' use of competitions, instructional

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peaks, varied skills employed in research projects, free choice of activity, presentations in front of an audience, and the use of surprises in learning. The article shows that many experiences took place on field trips, while others transpired during what seemed like ordinary frontal, teacher-centered instruction. Overall, these key educational experiences reflect the "deviance" of individual teachers from patterned instructional programs, and students' "chaotic-like" behaviors during the pre-planned school schedule. During key educational experiences the teachers were deviating from formal instructional schedules and the students were neither sitting in silence, nor complying with formal directives. Rather, they were shouting with enthusiasm, rejoicing in their learning, at times ignorant of the fact that they were actually learning.

Conclusion: This article shows that in Israel learning is equated with noisy and rather informal modes of instruction, suggesting that "active" methods have long-term educational effects on students' lives.

Keywords: Learning; classroom instruction; key experiences; Israel; culture.

1. INTRODUCTION

In one of my social studies courses for high school seniors, I conducted a discussion on possible contradictions between democracy and national security. The pupils worked in teams, preparing arguments for or against each position. The discussion between the groups provoked excitement, with pupils fervently shouting at each other. Suddenly in walks the principal, asking if all was under control. I answered that it was. After class the principal approached me and asked whether I had discipline problems in class and whether I had managed to finish teaching the required material" (reported by a high school teacher).

This incident reflects a common wisdom among educators, pupils, and parents alike, namely that silent classrooms are conducive to learning [1]. According to this position, silent classrooms provide conditions for effective learning, where teachers can cover the required curriculum in predetermined timing and at a predetermined level [2-4]. It is further assumed that noisy classrooms provide fertile ground for pupil misbehaviour and disengagement. For example, critiques of open or progressive schools claim that unorganised debates, open discussions and individualised learning might provide pupils with an opportunity to use the noise and din during such activities to disrupt classroom order. The common assumption is that learning in such settings undermines classroom order and exacerbates discipline problems. Learning and noise are regarded, then, as oxymoronic.

This assumption is indeed heralded by principals who pride themselves on the silent learning climate in their schools, regarding it as proof of effective learning. Teachers, too, consider silent classrooms as a key for learning and are inclined to identify a silent classroom with efficient learning. Even pupils and parents emphasize the importance of a solemn atmosphere for learning, claiming that pupils cannot study properly in "noisy" classrooms.

In contrast, a growing body of scholarship has begun to undermine the sweeping conclusions of this common wisdom. Such criticisms stem from recent theoretical developments that point out the inability of traditional bureaucratic school systems (which opt for silent classrooms) to cater for long-term meaningful learning amongst pupils. Theoretical trends such as "constructivism in education", "active learning", and "authentic instruction" look for instructional and curricular features that allow pupils to have meaningful long-term

learning experiences [5-8]. Furthermore, an increasing volume of research showing that there is no simple correlation between classroom noise and pupils' achievements supports such trends. This literature further suggests that under certain conditions silent classrooms might even create alienation and pupil disengagement [9,10].

Moreover, critical scholars claim that silence primarily serves schools as a control device, thus curtailing significant learning [11]. They claim that many schools maintain silent atmospheres as a disciplinary means, thus compromising significant didactic goals [12]. They argue that administrators settle for class attendance, focusing on the accumulation of required credit points for graduation exams. Many pupils react to such school policies with opposition, expressing little involvement in class and a protest of roaring silence. Nevertheless, most of them are well aware of the importance of a graduation diploma for their future. Consequently, they go through the motions and pretend to be busy learning, knowing that a facade of involvement is the real scale by which they are evaluated in school [13]. But behind their expressed silence, they harbour disengagement, alienation, and hostility towards school and school learning [14,15].

The debate over the silent classroom has theoretical and practical implications, and has consequently received much attention. While the academic critics of the silent classroom have gained momentum, educational policies in the past decades have pressed more firmly on schools to attain predetermined curricula and standards. For example, in the US the *National Commission on Excellence in Education*, and its repercussions in standards-based reforms two decades later has increased the emphasis on bureaucratic procedures and control mechanisms. In the UK, the National Curriculum has similarly pressed for standardisation and control of instruction and curricula. Such reforms have not passed unnoticed in the world, Israel including.

Notwithstanding the importance of this debate over silent, controlled classrooms, most of the extant literature on the topic is polemic in nature and ideologically driven. This state of affairs precludes any firm conclusion put forth by the protagonists in the debate. Furthermore, most of the studies on this issue were conducted in ordinary or traditional classrooms, where learning is focused on transferring "dead ideas" from teachers to pupils. As a result, they could not examine the extent to which significant learning takes place in silent classrooms.

To overcome these limitations, the present study assesses the extent to which silent classrooms enable students to experience meaningful instruction. It does so by analysing retrospective key educational experiences that have left a long-term mark on pupils' lives. The study uses the most significant learning experiences that adults recall from their school days in order to reconstruct the type of instructional practices that were evident in those classrooms. On this empirical basis it seeks to reassess the claims about the efficacy of silence in classrooms.

1.1 The Classroom as a Learning Society

Willard Waller (1932) characterised the classroom as a learning society that imposes contradictory tasks on teachers: namely to teach and to motivate pupils. On the one hand, teachers are required to transmit the required curriculum in large heterogeneous classrooms. To that effect, they have to teach the pupils a pre-planned and pre-scheduled curriculum and prove to their superiors (as well as to parents) that their pupils achieve formal requirements. In order to meet this goal teachers are encouraged to discipline their pupils and safeguard the orderly environment of the classroom. Hence, they are keen on having a

silent classroom, constantly supervising pupils and organising instruction using pre-prepared lesson plans [16,17].

On the other hand, the constant supervision and disciplinary control of pupils contradict the second task of teaching, namely motivating pupils, exciting them, and arousing their interest in learning. Different studies have shown that significant learning experiences occur when teachers supply pupils with a free choice of topics, challenging material, high level of skills, and relevant subject matter [5,9]. Therefore, in order to attain their second task, teachers have to ease their disciplinary supervision and minimise pupil control. Overall, the more teachers try to supervise and control pupil behaviour, the less they succeed in arousing motivation in their pupils, and vice versa.

There is evidence that in facing this dilemma most teachers choose to supervise classroom learning, thus compromising meaningful learning and inquiry. Studies have shown that the duality of the classroom as a learning society leads teachers to perceive silence levels as a central measure for assessing their professional capacity as teachers [18,19]. Many teachers also know that supervisors, head teachers, and parents all expect them to maintain a silent classroom in order to assure amicable learning conditions for the pupils [20]. These conclusions are supported by findings of leaders in school effectiveness studies, who concur that silent and focused classrooms are more conducive for learning [21].

The inevitable compromises that teachers make – preferring controlling rather than motivating their pupils – stem from the organisation of the school [7]. The bureaucratic principles of public schools reward teachers who discipline their pupils, while obstructing those who seek to motivate the pupils by using informal strategies [22]. The following analysis suggests that silence in classrooms is indeed driven by organisational considerations.

First, hierarchical teacher-pupil relationships encourage teachers to maintain distance from their pupils, avoiding improvisation and flexibility [17]. They prefer to follow pre-set course outlines while preventing pupils from developing an independent learning agenda. Second, the bureaucratic requirement to abide by impersonal rules and regulations leads most teachers to meticulously cover the material in the curriculum while blocking new initiatives and learning ideas that are not "test material". To meet these requirements, teachers strictly hush their classroom so that they can "cover the material" in time. Thus, dictation from the teacher's notebook and reading out aloud from pre-prepared worksheets create the feeling of serious and silent learning, especially to external spectators. Third, school inspection rules also pressure teachers to maintain silence. Inspectors mainly assess external features of classroom instruction: They check national school timetables, assess the attainment of the National Curriculum, focus on decreasing dropout rates, and on controlling pupil misbehaviour. Studies have indeed shown that inspectors focus on symbolic and formal aspects of teaching, placing less emphasis on the inherent technology of teaching, namely the motivation to learn and the meaningfulness of instruction [23]. Thus the ministry of education, school inspectors, and head teachers are all busy maintaining the core rituals of schooling, preferring silent classrooms to productive and meaningful, but unorganised learning environments.

This analysis suggests that bureaucratic schools encourage most teachers to discipline their pupils and insist that their classroom study in silence. Moreover, such traditional schools promote the belief that silence in the classroom indicates that pupils are busy learning.

Consequently, silence is usually equated with learning while noise and disorganisation are regarded as disobedience.

2. RESEARCH BACKGROUND

Although there is no direct evidence to prove that meaningful learning experiences can take place only in orderly, silent classrooms, there are different theoretical threads that indeed seem to support this general contention. First, Carroll's model of learning prompted many researchers to examine the effectiveness of teaching in terms of time [24]. The model assumed that all pupils can learn, and that pupils' talent variability required differential time allotments for achieving similar outcomes. Following these premises, different scholars measured the time allotted to learning in different classrooms, assuming that the time allotted for learning in a silent classroom equals to the time pupils are actually engaged with instruction [25-27]. These studies have shown that silent and controlled classrooms use up to 80 percent of the time allotted. Other studies have shown that noise level and pupil opposition in lower socioeconomic classrooms decrease the effectiveness of teaching by enlarging the gap between allotted time and engaged time [12].

A similar argument emanates from studies of school organisation. For example, a comparison between private and public schools suggests that orderly learning environments and achievement-directed school cultures provide more opportunities to learn and higher normative pressure toward school learning [28-30]. Thus, pupils in private and Catholic schools in the U.S. have higher achievements than their compatriots in public schools due to the fact that private schools have more orderly and silent classroom environments. In comparison, portraits of life in public schools show that many classrooms are noisy and disobedient, with teachers sacrificing instructional demands in order to attain the facade of a controlled classroom. With some generality, then, these studies support the claim that silent classrooms are indeed more effective for learning.

Third, school effectiveness studies – a conceptually independent body of literature – have a similar view. These studies have attempted to extract basic features of school organisation and culture, which set some schools ahead of the pack, and emphasised that silent and controlled school environments yield high achievements [31-35]. In contrast, in schools that lack leadership and control mechanisms over pupil achievement, pupils evade learning while settling for the lesser side of the educational opportunities that schools provide.

Although they differ conceptually and methodologically, these three lines of study concur that orderly and silent classrooms constitute the grounds for efficient learning. They also seem to agree that noisy, uncontrolled classrooms harbour disobedience and pupil disengagement. Notwithstanding this agreement, these theoretical schools share similar shortcomings, which should preclude a hasty acceptance of their conclusions about the effectiveness of silent classrooms for meaningful learning.

There is reason to suspect that what these studies call "learning" is not really meaningfully experienced as such by pupils. These cumulative models of learning assume that learning is a slow process that takes time to materialise, with pupils accumulating knowledge by sitting in classrooms day after day, year after year. There is reason to believe, however, that meaningful learning experiences cannot be equated with the outcomes measured by most studies in educational research. School achievements in mathematics, science, or reading cannot be equated with meaningful learning experiences. Consequently, these studies have

not yet provided sufficient evidence to decide that silent classrooms are indeed necessary for producing meaningful learning experiences.

Overall, existing research does not provide us with a resolution to the question of whether a silent classroom is actually a learning classroom, or more accurately whether a learning classroom is necessarily a silent one. The aim of the present study is to fill in the gap in this literature and test the claim that a meaningfully learning classroom requires silence. Unlike most studies in this field, the present study examines meaningful and significant learning experiences that were reported by adults many years after their school days. Thus, by analysing these significant learning experiences, the present study attempts to examine whether these experiences occurred in classrooms that were silent, and if not, to assess the "noisy" activities in those situations.

2.1 The Study

In contrast to studies that use scholastic achievements as a criterion, the current endeavour uses meaningful, key learning experiences to assess the nature of effective instruction. Key learning experiences are those that have proved to have a decisive effect on pupils' lives [36-38]. They were episodes that allowed learners to evaluate their wishes, capacities and opportunities, and enabled them to break free from prior limitations and set themselves on a new path. These are the educational episodes that adults deemed to be the most influential in their lives, therefore serving as keys to their lifelong development.

2.1.1 Sample

The present study is based on a snowball collection strategy that culminated in a sample of 505 respondents, aged 21 and above (with a range of 21 to 75, and a mean age of 37 years). The sample is representative of the Israeli population, with the exception of rural residents who were over-represented. Students from two universities interviewed two adults from their neighbourhood, and personally reported on their own key educational experiences. After narrating their experiences, respondents filled out a questionnaire, which focussed on their best key experience. The present study focuses solely on school-related experiences. It is based on reports of 379 of the 505 respondents who reported on key experiences that took place in school. Overall, these respondents reported on 483 learning experiences. We used several criteria to select experiences: (a) we only used experiences we could tie with socioeconomic and educational background variables; (b) we focused on experiences which incorporated all the necessary features of organization, phenomenology and outcomes (see below); (c) we selected only those experiences which matched the task.

The extracted experiences were divided by school level. Most key experiences were recorded in high school ($n = 229$), with a smaller share in middle schools ($n = 92$) and primary schools ($n=162$). Statistical testing did not show any correlation between respondents' age and the type of institution that most prominently affected their life. This finding suggests that the results do not reflect memory-related recency effects. Moreover, it is possible that the design of the study triggered respondents to tell a story as a "turning point" narrative [39], though the phrasing of the questions asked respondents to report their best life experiences, or the most significant ones, without hinting at the fact that the study focuses on critical moments.

2.2 METHODOLOGIES

Data gathering was based on in-depth interviews in which the respondents were asked to report their three most significant learning experiences, whenever and wherever they occurred. After the interview, respondents were asked to choose the most significant experience of the three, and to answer a closed questionnaire related to it. Respondents were taped during the interview and the entire transcripts were taken from the tapes. Respondents were asked to address three main aspects of their key experiences:

- Organisation – in this part the respondents were asked to describe the organisation of the activity, focusing on teaching practices and methods.
- Phenomenology – in this part the respondents were asked to report their feelings during the activity, while discerning between intellectual, emotional, and identity-focused phenomenological experiences.
- Outcomes – in this part the respondents were asked to report the long-term effects of their key experiences, while discerning between effects on their values, behaviours, pragmatic decisions, and personality.

2.3 Data Analysis

The study used a grounded-theory approach, combining deductive and inductive content analysis of the interviews. The analysis started with a deductive coding of the narratives using categories derived from the pilot study. Further categories were inductively gleaned from the data. Each experience was divided into segments (sentences and paragraphs), and each was assigned a main title. Similar titles were grouped into theoretical categories, which were developed and refined as the coding continued.

Grouped categories relate to different teaching characteristics (i.e., authenticity, surprise), and to attitudes toward a "silent" and a "noisy" classroom. Other categories served to count episodes where noise indeed reflected disciplinary problems. After completing the coding, the frequency count of key experiences in each category was summed up. While we focus on the qualitative aspects of those key experiences, we thought that a quantitative estimation of the "ecology" of outstanding instructional practices is important in delineating the prevalence of various features of those events.

2.4 Rationale of the Present Study

The present study examines instructional characteristics that were salient during key educational experiences. The main objective is to characterise the instructional methods and strategies that teachers used during these episodes. Conceptually, this approach seeks to assess whether these are "silent" strategies, and whether these methods indeed controlled and silenced pupils. This exercise is of utmost significance for the present study for two reasons.

First, if key educational experiences were not formed when teachers used "silent" methods, but rather when instruction was "noisy", then the claim that meaningful learning can take place in seemingly uncontrolled and noisy classrooms is borne out by the data. Second, to the extent that key educational experiences have indeed occurred in silent classrooms, we will be in a position to examine what actually happened during these silent episodes, namely whether pupils were passive (simply listening to a teacher), or rather were busy with

disciplined learning activity. Finally, our approach enables us to assess the extent to which Israeli cultural codes drive "noisy classrooms" to prove effective in creating lifelong learning experiences [40].

3. FINDINGS

The reporting of findings is divided into four sections. The first two sections test the assumption that meaningful learning experiences mainly occur in silent classrooms. They examine the instructional strategies and methods that teachers used during key educational experiences, focusing on informal activities on the one hand, and on the contents of the activities on the other. The third section shows that a significant number of key experiences occurred outside the classroom, during field trips and "noisy activities". The fourth section suggests that even teacher-centered, lecture-type instruction can remain engraved for life, conditioned on their instructional characteristics.

3.1 Contents and Activities in Key Educational Experiences

Table 1 presents the frequency distribution of the categories, which were used to describe instruction during key, highly meaningful learning experiences. Based on the analysis of the narratives, we distinguish between content and activity characteristics. The reports suggested that many key experiences occur in silent classrooms, but that the content of instruction during these episodes was relevant, authentic and challenging. However, the results clearly suggest that many key experiences took place in noisy classrooms, where the activities did not allow teachers to maintain a silent, orderly environment.

Table 1. Frequency distribution of content and activity feature in key educational experiences

Teaching Strategy	Type	Frequency (N)
Authenticity	Content	121
Relevance	Content	63
Challenge	Content	58
Performance in Public	Activity	56
Experimentation	Activity	34
Use of Multiple Skills	Activity	32
Constructing Peaks	Activity	25
Allowing Choice	Activity	21
Using Competitions	Activity	20
Using Surprises	Activity	10

The following exegesis of the results uses original transcripts from respondents' reports in order to exemplify the contents and activities during key educational experiences, and to characterise the atmosphere during these episodes. We usually cite one quote for each category, although we could have provided many more. The numbers appearing at the bottom of the quotes refer to respondents' ID code and memory number.

3.2 Content Characteristics

The most salient content characteristic appearing during key educational experiences is authenticity. Authentic instruction is usually defined as teaching real-life topics, or as doing

real-life activities [5]. Most respondents considered authentic instruction as "learning from life and about life" – learning that is neither scholastic nor disconnected from real-life and the adult world. Rather, the contents of instruction extend from real-life topics and connect pupil learning to their surrounding world. Authentic instruction brings pupils into direct contact with reality, without the mediation of a formal and emotionless school curriculum, which by its very nature relates to pupils' "ratio", or cold reason [41]. In contrast, direct contact with real-life situations allows pupils to feel and think at the same time, thus engraving the educational activity for a long time.

The analyses suggested that authentic instruction usually took place outside the ordinary classroom, immersing pupils in real-life situations. These settings were devised using learning expeditions and by visits to institutions, or by an active participation in an event [42]. These visits and active participation in authentic settings can turn routine topics into lifelong, key educational experiences. For example, a 24 year old respondent described an authentic lesson his teacher devised instead of a routine social studies lesson.

"In our social studies class in the 11th grade, we conducted discussions about motor vehicle accidents. At one time we went to visit the hospital where many accident casualties were hospitalised, some in critical condition, some even comatose. It is rather difficult to admit, but no teacher, no lecturer, nor traffic professional who came to the classroom to talk to us, no officer or doctor could ever be such a strong and real education figure as that critically wounded person in that ward. The learning method was the situation itself... healthy children standing face-to-face with an accident victim" (44/3).

The second most frequent category was relevance. Understanding, as John Dewey claimed, happens only through an experience, which is related to pupils' lives [43]. Learning must stem from past experiences and build up from the local to the universal. Similarly, many scholars claim that learning has to happen "close" to the individual (in his "proximal zone of experience", as Vigotsky says), and relies on pupils' original experimental discoveries. This perspective indeed promotes school reform in many places, which opt to adopt relevant instruction and curriculum that connect with pupils' lives. As children differ from each other in their abilities, interests and past experiences, a relevant curriculum must allow each one to choose his or her personal topic of interest. Noteworthy in this respect is TheodoreSizer's dictum that "Kids Differ" [8,44], a basic principle later developed in his Coalition of Essential Schools.

Examples for relevance in teaching reappear in respondents' narratives of their key educational experiences. For example, a 30 year old educational counsellor told us about the research project she did during the seventh grade.

"Seventh grade was the Bar Mitzvah year in the kibbutz, part of which was dedicated to a project which examined a topic related to Israel. At that time I was reading a book by Dvorah Omer, called "Love unto Death", which describes a love affair between a young girl from the army during 1947-8, and one of the boys there, who was later killed. As a seventh grader I was touched by the story and decided to write my project on that. It was a true story and I decided to write my paper on that topic... My father drove me to Dvorah Omer's house and I talked to her... she let me read some of the diaries that the girl (Zohara) kept, which were the raw material for the plot...My father also drove me to see one of Zohara's childhood friends... reading Zohara's diaries and talking with her friends linked the reality and my imagination (the book)... the mere connection of something I read with its reality made that experience

that much more unique and fascinating... my decision to study literature and education rose out of my feelings and interest in studies which could be applied to reality" (279/1).

The third most frequent content characteristic is challenge (n = 58). Many respondents, some of whom had previously defined themselves as mediocre or poor pupils, noted that their "great moments of learning" were characterised by the difficult challenge they faced. Often, those were tough research assignments given to pupils in or out of school. In other cases, pupils were faced with topics and assignments that were intellectually and emotionally challenging, and promoted stormy and lengthy debates in class. All in all, challenging assignments demanded that pupils make the most of their personal resources (thinking, will-power, self-discipline and motivation), while requiring high performance levels, concentration and engagement. One of the most challenging instructional strategies was based on teamwork where pupils had to solve difficult problems and assignments in a group. A respondent who reported on his physics class provided an apt example for this category.

"The teacher presented us with a time-limited challenge, namely to build a device which produces its own energy... the pupils spent the whole weekend trying out different ideas and methods, using all the material and knowledge they possessed as well as their creative imagination... of course we did not make it, but... we did not feel we were busy learning, but rather that we were dealing with the challenge of proving to that teacher that we could do it" (200/1).

The challenge in those tasks is often accompanied by a time limit, which creates a sense of urgency among pupils. In this and other cases we learnt that pupils dropped all other activities and focused their energy on solving the problem, since it was important for them to prove to their teacher that they could meet the challenge.

3.3 Characteristics of Informal Activity

Besides content characteristics, the analysis has pointed to seven other informal features of key educational experiences. The frequency count of these features appears in Table 1, and the following discussion elaborates on a number of them.

The most frequent instructional strategy we found (n = 56) is performance in public. Respondents have a varied perception of an "audience", including peers, adult guests (e.g., parents), and external evaluators. Performing in front of an audience puts pupils in a stressful situation and encourages them to attain their best performance. We have found that public success and immediate feedback arouse intense feelings and self-fulfillment among respondents. For example, a 44 year old respondent recounted that at the age of 15 she enjoyed her geography classes particularly because the teacher appointed her as a "little teacher". At the beginning of every lesson the respondent conducted a 10-minute rehearsal with her class peers.

"I enjoyed the activity very much. It was lots of fun standing in front of the class, explaining the issues and discovering that pupils are interested and understand my explanations. I felt I was in command of the curriculum, that I was a good pupil, and that I was well able to explain the lesson to my classmates. The presence of the pupils prompted me to continue and explain and repeat it every time. This made me highly satisfied" (368/2).

The second most frequent instructional activity was research and experimentation. As many scholars already noted, significant learning occurs when pupils actively understand the

material, through experimentation and research activity [5,43,45]. Respondents' recollections of key experiences suggest that they were asked to gather data, perform tests, systematically document incidents, analyse data, and prepare a research report. Experimental work in biology class, or writing a theoretical paper in a social science class, created an almost singular experience where pupils felt that they are finally responsible for creating, criticising, and validating knowledge. For example, a respondent reported that as part of his high school geography lessons he had to choose one elective course out of several options, and he chose navigation because it interested him. In this informal framework, the geography teacher taught the pupils to read maps and draw navigation routes.

"Learning was practical. We went out for two- or three-day field trips. At the beginning of each trip the teacher explained the maps, and then the pupils went out for a hands-on experience, alone or in pairs... The independent experimentation was very enjoyable. It gave us a feeling of independence and control, confidence, and a sense of orientation... In time, this preoccupation with navigation turned from a hobby into a semi-professional career. I took part in many navigation competitions in Israel and won first prize in quite a number of them" (384/3).

The third instructional strategy we deciphered was skills. Indeed, supporting a rich research tradition [46-48], the present study found that instructional activities that used a variety of pupils' skills tended to leave their mark for many years. Examples are numerous and varied: artistic skills (acting, dancing, singing, painting), technical skills (building and dismantling construction) or personal skills (handling time pressures, organisation management, teamwork). In all the narratives in which this strategy appeared, the activity demanded that pupils use more than one skill. A good example is the story of a respondent who today works as a guide in a science museum.

"In the ninth grade biology class, we were asked to write a paper on air pollution. Later, the teacher asked for volunteers to put up an exhibition on air pollution. I volunteered and together with a team of five other pupils we were busy for a whole month preparing the exhibition. It was important for us to put across the message to all pupils, in a clear and understandable way, so that even those who were not interested in the subject would support the issue. Our cause was sublime: to arouse awareness of the risks of air pollution. Unlike our theoretical paper, here we had to use many skills, working under a pre-set timetable and using creative and original skills. For example, we drew the globe crying for help: "My hole in the ozone layer was growing and the icebergs were melting..." On another poster, we pasted all kinds of sprays ejecting preones, which attack the ozone layer. In order to illustrate acidic rain we drew black forests, deserts and wilderness, versus green and fresh grass with budding flowers. The teacher gave us a free hand in deciding which topics to focus on, and how to present them... The exhibition, which we built single-handedly, was positioned at the entrance of the school and was highly successful... we received praise from other pupils. During the activity I felt self-fulfilled and experienced a sense of vocation. Constructing the exhibition by ourselves gave me a sense of motivation to learn and apply myself; it taught me what teamwork and cooperation is all about, and I felt in control of the subject matter" (451/1).

This report illustrates the importance of using pupils' skills. Firstly, the use of skills can influence pupils' engagement in class, as they are given the opportunity to express their skills and capabilities – a very different feat to what is commonly demanded in silent, orderly classrooms. Secondly, exhibiting their prowess using different media (painting, writing,

putting up exhibitions, theatrical shows) allows otherwise lesser involved pupils to take part in organising such activities [6]. Furthermore, the multi-media character of such activities promotes the use of many senses (touch, vision, hearing, smell, and even taste) and touches a variety of interests, thus allowing almost every pupil to take part in the activity and enjoy learning.

Another strategy that teachers used to challenge and motivate pupils was evident in their use of competitive situations. Respondents reported that their peak motivation occurred during the competitions that their teachers conducted in class. Competitiveness was not the main theme of the activity, but rather a catalyst that the teacher used to prompt pupils to take an active part in learning. Nevertheless, competitions can transform a dull lesson into a highly emotional endeavour. As a result of such arousal in class, pupils retain long-lasting memories of the content of instruction, or of its moral principle. For example, a young respondent described a covert though significant competition that her teacher initiated between her pupils.

"As part of my high school curriculum I chose to study Arabic. In my final year we had to pass an oral graduation test. But most pupils, myself included, had a very hard time with that. We felt stressed and tense, fearing the test... One day the teacher invited us over to her house. We watched a short videotape of her last visit to Egypt, listened to songs in Arabic, and she gave us some refreshments. We talked and laughed like friends... Then the teacher asked us to tell a story in Hebrew, and she helped us write it in Arabic. Then she prompted us to have a dialogue in Arabic about the meaning of the stories. Thus, we began a sort of invisible, but positive, competition, as each pupil wanted to express his own opinions and oppose the others... Finally, we learnt to love Arabic and succeeded nicely" (451/1).

Surprise – although the least prevalent strategy we extracted – represents another unique means by which teachers arouse intense feelings and motivation. Surprises in activities create highly emotional excitement and promote pupils' cognitive insight. Furthermore, such situations create high motivation among pupils, who seek to discover or solve the mystery that the teacher cast into the activity. Surprising activities could take form in a variety of ways. According to some reports, key educational experiences took place when pupils did not know what to make of the teacher's plotted lesson. For example, one respondent described a surprising activity that her science teacher created in primary school.

"The teacher, a colorful personality, called for a volunteer and asked him to lie on her desk (usually covered with test tubes). She blindfolded him and forbade us to react throughout the experiment. In addition, we were neither told what the subject matter was, nor about the purpose of the experiment, so we did not know what to expect. The teacher inserted pieces of paper between the volunteer's toes and lit them. The pupil began rotating his legs as if he was riding a bicycle and just in time the teacher removed the burning pieces of paper. This is how I learnt the fascinating topic of instincts. The surprise caused excitement in class" (51/1).

This story demonstrates that pupils had no clue as to what was about to happen in class. Then, in what seemed like a scene from a highly charged emotional gathering, e.g., where the preacher is inspiring his congregation, the respondent had an insight – the topic of the lesson, which earlier had seemed to be an unfocussed, chaotic educational activity, became clear to her.

In reviewing the results, it appears that key educational experiences did not take place in silent classrooms. The analyses have shown that pupils were all but slumber: they were active, fervent, enthusiastic, and keenly interested in the topic; they were emotionally aroused, feeling excitement and fulfillment. The content and activity characteristics described here suggest that for instruction to have long-lasting effects on pupils' lives, it cannot be based on simple teacher-centered strategies. Likewise, teacher-centered, controlled and supervised classrooms left few traces in pupils' recollections. Rather, instruction that passed the test of years was based on "noisy" and seemingly disorderly strategies.

Performance in public was necessarily predated with uncontrolled, cheerful rehearsals; competitions generated shouts and enthusiastic engagement; relevance and authenticity made things dear to pupils' lives, thus implicating their selves in the activity, resulting in highly emotional and fervent involvement. Although we do not test this hypothesis here, we conjecture that instructional activities that combine several of the above mentioned content and activity features are more likely to have long-lasting effects on pupils' lives than those that use only one or none at all. All in all, the evidence suggests that although key educational experiences did not necessitate noise or disorder in class, they rarely occurred in silent, highly supervised classrooms. The next section elaborates on this claim.

3.4 Outward Bound: Learning Outside the Classroom

Dewey and Whitehead, the American pragmatic philosophers, noted at the beginning of the twentieth century that instruction through the use of experimentation could translate disconnected scholastic knowledge into the child's own reality, and thus revive "dead ideas" [43, 49]. According to their position, only experimental learning, which connects classroom learning with authentic and relevant topics outside the school, deserves the title of education. The findings of the present study support this philosophical view, by showing that key educational experiences occur "in the real world", i.e., outside schools' boundaries [42].

Indeed, many respondents (n = 65 or 13.5% of the experiences) pointed to the fact that their key educational experiences took place outside the classroom. Learning through field trips, visits to an orchard, and excavating genuine archaeological sites combined theoretical content (previously studied in class) with its authentic, natural setting. Outward-bound activities are enriching, helping pupils gain insight about the topic and its natural context. For example, a 45 year old respondent spoke about her high school biology classes, which took place outside the classroom. She described how enjoyable these field trips were, and why pupils were cooperative the whole time.

"My high school science teacher was an avowed science lover and an expert on reptiles and plants of all kinds... Few were the lessons we had indoors. Sometimes we were in the lab, and sometimes we strolled in the fields surrounding the school, or travelled far away on field trips... he used to talk about the topics while picking up stones and telling us: "look, under this stone I found the reptile which is called so and so..." We never dared interrupt his lessons, because the experience was so engaging that we did not want to make trouble in class and be punished and miss the next field trip" (304/1).

3.5 Silent Engagement in Teacher-Centred Classrooms

Significant learning experiences rarely occurred in silent classrooms. Nevertheless, the evidence suggests that under certain conditions even teacher-centred instruction can produce key educational experiences. The analysis found that many respondents reported their significant learning experiences to have occurred in teacher-centred classes (n = 75), where teachers combined authenticity, relevance, surprise, or peaks into the curriculum. Integrating these characteristics in teaching resulted in pupils' cognitive curiosity and emotional involvement with instruction. For example, one respondent described her high school history teacher as follows:

"The teacher entered the classroom and said she was going to talk about the Holocaust. This was not surprising, as it was part of the curriculum. We took out our notebooks and pens but the teacher said, 'there is no need'. I have to admit that I personally did not like history nor did I like the teacher. I used to disrupt and disobey from time to time. She started the lesson with a presentation from that period. She said she was going to speak as a Holocaust survivor. She talked about her parents, about their life in the community. She didn't ask questions – it was one continuous lecture... we sat there for two long hours mesmerised. We even gave up the break. At the end of the lesson she opened the box that stood on her table, and took out a bar of soap, displaying it as her family members. We were shocked. I can still remember that lesson in detail" (232/1).

There is reason to believe that the silence in this and in similar classrooms was due to the pupils' keen interest in what the teachers had to convey. To the extent that the contents were authentic, challenging and relevant to pupils' lives, they willfully cooperated with their teacher's agenda. To the extent that such encounters required pupils to incorporate their personal resources into learning and forced them to think, to introspect or retrospect; to the extent that they learnt new things about their environment and about their own selves – to that extent pupils had immersed themselves in learning, entering a state of flow [50]. Unlike traditional teacher-centered instruction, learning in highly challenging and authentic classrooms does not allow pupils to remain passive. Silence in these cases resulted from attentive listening on the part of the pupils, rather than from an enforced discipline by the teacher. In conclusion, the testimonies that we analysed prove that it is possible to significantly affect pupils even in teacher-centred classrooms – without the need to use "firecrackers", charisma, or highly charged rhetoric.

4. DISCUSSION

The present study has provided an initial description of instructional practices that teachers used in what time proved to be adults' most meaningful educational encounters. It has demonstrated that certain content and activity characteristics generated cognitive and emotional involvement among pupils that affected their life henceforth. The following discussion of these results touches upon four main conclusions.

First, the study has shown that most key educational experiences occurred in a "noisy classroom" rather than in a "silent" one. While the literature assumes that teacher-controlled and silent classrooms constitute arenas conducive to learning, the present study shows that meaningful, key educational experiences mostly occur during an active and noisy interaction among class peers, during a public performance in front of an audience, while working in pairs, through interviewing and arguing, and by utilizing different skills and capabilities.

Teachers' use of competitions often led to pupils shouting at each other with excitement. The construction of peaks and surprises in the curriculum generated involvement and enthusiasm. The requirement to exhibit diverse skills and capabilities often created a carnival-like atmosphere in class.

Thus, in contrast to pupils' usual silent attendance in school, the instructional strategies described here necessitated pupils to attend to relevant and authentic issues, which demanded their utmost cognitive effort. During these key educational episodes, learning did not require silence. On the contrary, silence in class would have annihilated learning and dulled the emotions that surfaced during the activity, replacing them with a cold, meticulous scholastic activity. One respondent summed up her experiences poignantly: "That was not a silent classroom, there was a lot of noise, but such a healthy noise, where everyone called out to the other: 'I found, I discovered, come see what I've got'. That was extremely interesting, the noise, the sounds, the voices. These are things I remember until today" (200104622).

Second, some of the experiences mentioned here did not involve stormy verbal interactions. Nevertheless, the pupils were far from being passive. Instruction in such contexts impelled pupils to use their capabilities in an active and motivated manner. For example, the paper that the respondent wrote on the protagonist in Dvora Omer's story (relevance), or the preparation of drawings and presentations for the air pollution exhibition (skills), did not require that the respondents work in a noisy setting. Indeed, pupils can perform such assignments without talking, some without need for interaction whatsoever. Nevertheless, these tasks definitely demanded respondents to use their cognitive ability, skills and capabilities, while exhibiting enthusiasm and learning derived from inner motivation. All in all, it seems that a passive engagement, which characterises silent classrooms (where teachers talk and pupils listen), is rarely mentioned in the context of significant, key learning experiences.

Third, admittedly, in about 10 percent of the experiences the activity took place in the context of a teacher-centred classroom, which could be externally described as a silent classroom. Nevertheless, the results have indicated that the key experiences that occurred in these settings were not like any other silent, teacher-centred lesson in school. In almost all cases we found the lesson to be authentic, relevant and challenging, and the topics were mostly connected to pupils' lives, or to burning issues that had to do with the community, the school, or their country. Thus, although the teacher controlled the classroom and instructed in a structured method, pupils in these settings participated enthusiastically, with overt excitement or covert emotional involvement. This implies that teachers can maintain conservative instructional activities, yet modify the contents of the curriculum in creative ways, connecting with and reaching to the life-world of their pupils. Such curricular modifications can promote exciting debates that would set them apart from the tradition of neutral, insignificant and routine school learning.

Fourth, the current study suggests that the alleged contradiction between noise and meaningful learning has little empirical support. It has shown that "positive noise" was evident during key educational experiences, yet it did not harm order in the classroom. In fact, quite the reverse: respondents remembered many teachers because they promoted noise in their classroom, without losing control over instruction or discipline. Actually, the reports have indicated that some teachers (n = 25) considered noise as a positive factor that improves learning and discipline in the classroom. This contrasts with the common belief held by most teachers that such noise harms the pupils' ability to learn. Moreover, 40

respondents explicitly referred to active learning and noise as beneficial, because these features formed a positive learning atmosphere, aroused interest in the topic, and caused enjoyment and, paradoxically, even order and discipline in class. The following quotes attest to this statement: "The classes were conducted as a debate, the theoretical material which we were all familiar with was taught in the most interesting way possible, and this I believe is the reason there was no need for disciplinary measures. The pupils came to learn, because of the lesson" (178/1). "The experiment related to the topic... we worked in teams and the teacher passed between us and talked with us... The noise of talking did not bother us. It was almost like a "free hour" which nobody wanted to miss (215/1).

Finally, this study supports the thesis by Waller (1932), Bidwell (1965), and Yair (1997), who claimed that instruction is undertaken in a sociologically ambivalent setting [51], with teachers torn between the need to motivate pupils and to discipline them at the same time. The results suggest that teachers who preferred to inspire their pupils and excite them through learning have been remembered in the long term. In contrast, the efforts to discipline pupils result in boring them. Thus, the bureaucratic emphasis that compels most teachers to emphasise discipline, social order and silence in class results in pupils remembering very few teachers and meaningful learning experiences. An emphasis on order, discipline and silence curtails the potential influence of teachers on pupils, and neutralises the basic goal of schooling: developing interest and love for learning, and influencing pupils' lives.

Nevertheless, the contradiction between discipline and motivation is not inherent in classroom instruction [9]. The present study suggests that by creating high motivation for learning, teachers can neutralise the need to discipline pupils since learning results from pupils' inner interest. The study has indeed shown that when instruction was authentic, relevant and challenging, when it was built on suspense, surprise, peak moments and competitions – pupils participated energetically, without causing discipline problems. The noise – and there was much noise during these key experiences – was the noise of learning, of enthusiasm, of the enjoyment involved in acts of creation. There is evidence that the insistence on disciplining pupils results in boredom and – as a consequence of that – in noise, discipline problems, and alienation from instruction [52]. Upon reflection, it seems that teachers fear discipline problems in their classroom because they understand that what they do in their silent classroom actually bores their pupils.

5. CONCLUSION

To conclude, it seems that the question is not whether noise is conducive to learning, but rather what type of noise. The current study has shown that high noise levels that derive from enthusiasm and interest in learning do not contradict school goals. Therefore, if schools wish to affect pupils, they need to find ways to allow more teachers to be authentic, relevant and challenging. They need to expand the use of surprises, peaks, competitions, and independent research. The present study has shown that silent classrooms conceal what time will prove to be meaningless instruction. In contrast, it has shown that what externally seems to be a disorderly, chaotic classroom may actually constitute an arena that is educative and will be meaningful for a lifetime. In concluding this paper we suggest that there might be some Israeli uniqueness to our results, as culture always plays a part in learning and instruction [40]. The Israeli national habitus fits the features we identified here [53], and it is possible that students in other countries might be shocked by some of the outstanding activities we described here. Comparative studies need to ascertain this conjecture.

ACKNOWLEDGEMENTS

This paper is based on data collected by the first author in a large study of key educational experiences and on the doctoral dissertation of the second author. The study was supported by small grants from the Shaine and Eshkol foundations at the Department of Sociology & Anthropology, and the NCJW Research Institute for Innovation in Education, Hebrew University of Jerusalem.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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