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The Technology Workshops at Oundle

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ABSTRACT: Psychologists have shown that knowledge can be acquired independent of practical action, by observing and imitating others and by extracting knowledge from vicarious experiences coded in text. Yet experiential learning theorists suggest that real learning takes a practical event to embody it. In schools we ask our students to learn through study. This paper examines a concept of learning in which personal experience is the base or framework for learning. Oundle Public School has a tradition of learning through technology workshops. Using the case study and narrative research traditions, the author illuminates the philosophy behind this orientation. The period of history which spawned the orientation has many parallels to the information revolution we are witnessing today. The response by the headmaster then, including the curriculum policy and implementation issues which relate to it, are central to the debates and responses which characterize curriculum change now. The philosophy that gives Oundle its reputation in technological education is visited, the lessons it imparts are reviewed.

Keywords: experiential learning, history of technology, philosophy of technology

Oundle, a five hundred year old middle-class public school in Northamptonshire, England (known locally as the Midlands) has all the characteristics of many classic privately endowed university preparation institutions. It is steeped in tradition beginning with its location: The trial of Mary Queen of Scots (some 400 years ago) took place in Fotheringhay Castle, two miles from the small market town of Oundle. Academic traditions, while important and very much a part of the Oundle story, pale in comparison to the institutional and financial survival myths/realities which characterize the school. An endowment by a dying Sir William Laxton, for example, heads the list of people with timely resources. And for spiritual heritage, Oundle boasts of having helped fuel the puritan movement in England thanks, according to a book on the history of Oundle (Flower, 1989), to a radical named Hackett, an illiterate Oundelian. Hackett, who claimed himself to be the reincarnation of John the Baptist, was ultimately convicted of treason and hanged! And, of course, the architectural history and stone landmarks that exist to this day provide evidence of age, tradition, and character.

Tradition notwithstanding, what really makes Oundle distinctive among its institutional peers, according to literature on the school, is its reverence for a practical curriculum, especially in science and technology. The number of references to this distinctiveness is striking (Flower, 1989; Palmer, 1977; Walker, 1957; Wells, 1924) and lends credence to the extent of its influence. Why would a public school institution which prides itself on preparing the next generation of leaders for British society bother with

a practical curriculum, especially one that focuses on science and technology? The answer is provided by Wells (1924) in a book called The Story of a Great Schoolmaster' and other school literature. The headmaster around whom Wells created a legend and a mystique was Frederick William Sanderson. Sanderson was appointed as headmaster of Oundle Public School in 1892 and over thirty years introduced to everyone associated with the school a unique philosophy. The central tenet in that philosophy is perhaps best described as 'experiential learning'. 'The real work of the school is done in the laboratories', he was quoted as stating on many occasions (Freebairn, 1992, p. 8) to students and board members. His first innovation when coming to Oundle was the starting of mechanical workshops. Wells, an admirer of Sanderson and patron of the school, goes into great detail demonstrating how influential Sanderson was in changing the classic didactic grammar school pedagogy used then (and now) in most schools.

The context in which Oundle transformed itself as an institution and Sanderson himself as a curriculum innovator was the industrial revolution, a period of history not unlike today's information revolution. Reading Well's book one cannot help but be impressed by the similarities between the debates taking place then and now. To what extent, school leaders would ask, should the school direct its curriculum to the changes signalled by industry? Technological advancements at the time included ocean transport, increase in mechanical and agricultural efficiency, and improved means for communicating.

> We still call that time the mid-Victorian period, but the history teacher of the future, more sensible than we are of the innocence of good Queen Victoria in any concern of importance to mankind, is more likely to distinguish it as the Advent of New Communications. These new inventions are 'abolishing distance'. They are demanding a political synthesis of mankind. But there is little understanding as yet of this now manifest truth (Wells, pp. 15, 16).

How parallel is this period to today? Henchey's (1987) commentary on the information-based technological world would suggest there is a remarkable similarity. Henchey (1987) describes the new technological world in terms of 'new cognitive basics'.

> The new basics of the information age . . . include the following: understanding complex relationships, knowledge of how systems work, creativity and imagination in re-creating information patterns, critical evaluation of communication, ability to select the relevant from the superfluous, ability to project consequences of trends using various assumptions (p. 52).

One could argue, much like Wells did in the early part of the 20th century, that many people are unaware of these manifest truths. In the context of schooling, Layton (1993) provides a further insight that Sanderson might have found reassuring:

> . . . a general characteristic of school technology and one which makes it different from many other school subjects is its engagement with practical action in the made world. No subject challenges the historic role of the schools as institutions which decontextualize knowledge quite so strongly as does technology. It represents a major revaluation

> of the kinds of knowledge which a society deems important. Academic knowledge has hitherto been king and, in most subjects, learning has been an end in itself. What technology signals is the recognition that practical knowledge, i.e., knowledge which empowers its possessors in the realms of practical action, is now being accorded equal status (p. 15).

This paper is based on a review of the literature on Oundle and a visit this author made to the school recently. The case of this successful public school known for its technology workshops was too intriguing to overlook, especially for someone with both a curriculum policy and institutional analysis interest. Would remnants of this tradition be visible today? Was/is the Sanderson philosophy a myth or a reality? Are there any lessons which might be learned from this biographical and institutional case study? More relevant, are there any themes which characterized program development in technological education then which can be exposed, refined, and applied today?

THE IMPORTANCE AND PLACE OF TECHNOLOGY IN THE CURRICULUM

Technology as a school subject, while it currently attracts much attention in the education literature, suffers from a stigma. It is often not thought of by school leaders, especially those whose formal education has focused on didactic learning, to be as important as school subjects concerned with preparation for the university disciplines and the subsequent leadership positions in the government and private sector, which often follow for graduates. This stigma, were it an ethnic distinction, is what advocates of affirmative action would call a silent crime. At the same time, the fact that there is a status differential between and among school subjects at all, is not something that is consistent with the egalitarian purposes school leaders are supposed to espouse. As such, educators with position have to be careful about how they portray their school programs. This was certainly evident in a meeting with the current headmaster of Oundle. He was most polite in receiving an educator from abroad and equally gracious in addressing the topic of technological education. ‘What’, he asked me, ‘is technology and why is it the one activity at Oundle which has the longest waiting list of students’? Was that headmaster unaware of the sense-of-self and independent learning benefits associated with a practical curriculum, I wondered? The relation between student learning and the natural tendencies of students to investigate the physical and sensual worlds (a relation often overlooked in our perception of how people learn and communicate) had been confirmed many times in my own teaching career. I gleaned, therefore, that the headmaster’s question must have been rhetorical. Had I realized it at the time, my response might have been different. The brief interchange, in retrospect, did nevertheless inspire a new direction in my own thinking about teacher development and socialization, prompt a critique of didactic learning generally, and satisfy a lingering personal and professional curiosity.

What is curious about the Oundle history is that this one school, this case, helps expose a problem which exists in many schools and school systems which have followed the English grammar school pedagogy and classic curriculum. Many of these schools have adopted a curriculum (including what and how something is taught) which meets a specific intellectual and academic purpose, but with little regard for the non-academic needs of young people. This curriculum development 'we know what's best' disposition has characterized schooling in most developed countries for over a century and takes its genesis, in part, from the Platonian notion that matters of the mind can be separated from matters of the heart and hand, i.e., the body. Layton's comments on the pedagogical distinctiveness of technology in the curriculum, referred to earlier, reinforces this point.

THE SANDERSON LEGACY

The method Sanderson employed to engage young boys of the time in learning was experiential. He believed that each student should first find a subject or topic of interest from a wide variety of offerings and then pursue that interest in an action research project. The method is referred to in the Oundle school literature as 'Dalton-like' [each student was thought of as an original researcher]. In quoting Sanderson himself, Freebairn (1992) states: 'He [Sanderson] felt that to enable schools to carry out this prime duty', i.e., to make the highest use of each member, it was necessary to have a wide range of subjects in the school.

> We shall see what changes should come over the schools. They must be built in a large and spacious manner, the classrooms being replaced by halls or galleries, in which the children can move in the midst of abundance, and do and make and research: not confined to a classroom. We shall see how much wider the range of the masters must be. We must have the crafts well represented, and a wide range of science, with workshops, scientific laboratories and gardens. Also, several languages will be taught, and there should be a spacious library, an art room and a museum. The methods will change from learning in classrooms to researching in the galleries; from learning things of the past to searching into the future; competition giving place to co-operative work. And somewhere within the field of work each boy may find his own part, and so contribute to the creative life, and grow by doing it, and be bitten' with the desire to do, and gain in purpose, in determination, in self-determination, in confidence and outlook (p. 5).

Sanderson's view was that at an early stage every effort should be made to get a boy at 'grip' with some part of knowledge, and that students should not be afraid to specialize at the early ages of 15 to 17, for,

> once a person has been introduced to a topic or subject of interest his or her love of that topic will evolve. A part of the emergence will be the need for extending one's knowledge and capacities. To impress the imagination of the young, science and crafts, romance, inventions, discoveries should be in abundance through the schools. The specialist will get inspiration from apparently little things in nature, or through experiments, but impress the average man, to excite the imagination and create enthusiasm, all these works should be offered in great wealth. Moreover, there will be given the opportunity for all talents and tastes (Freebairn, p. 6).

Sanderson believed in two great underlying principles. First, he believed there should be no school work which is not in some sense creative. Second, he believed, all school work should be co-operative rather than competitive.

> Tool sharpening there must be, the boy must know his Greek verbs in 'mi'[an infinitive form of a greek verb], or he must be able to solve quadratic equations, but let him regard such work as a conscious step towards some other great end. Classrooms, he said, are tool-sharpening rooms, necessary but subsidiary. The real work of the school is done in the laboratories, be it in the library or museum, art room or power station. . . . The old school set out to train leaders and employers, and exploited the acquisitive and possessive instincts. Examinations were similarly planned and asked the boy: How many Greek paradigms do you know? How many words can you translate into Latin? How many propositions in Euclid can you reproduce? How much knowledge have you acquired? How many brains do you possess? True education was 'creative'. The plays of Shakespeare were written as plays, and at Oundle they were produced as plays: As an author for careful study, Ruskin was more desirable than Shakespeare, partly because there were no 'school editions' of Ruskin with careful notes at the end and a glossary by the editor, and partly because Ruskin offered so many points of contact with life – from each a student could independently investigate some aspect of life (Freebairn, p. 8).

Sanderson believed research work was a great stimulus to creative effort. His own experience was that the stimulus of co-operative working is far greater than the stimulus of competition. 'The two are not of the same order of dimensions', he would say.

> To create the stimulus, the curriculum must be extensive and include many branches of knowledge. Boys will be promoted, not by an artificial order in form, but by method of grouping them for special work. Creative research work does not admit of order or merit, nor can it be marked. No creative work can be subjected to the devastating attack of the red ink and blue pencil. Much of a boy's work must be held sacred; it is his contribution to the common purpose. In course of time he will find where he has gone wrong and correct himself. The true research in libraries will widen a boy's knowledge of literature and modify it (Sanderson, cited in Freebairn, p. 8).

Sanderson believed that the teaching of physics and mechanics [an integral part of an engineering program that he designed while at Dulwich College initially and then later at Oundle] should be closely associated with mathematics on the one hand and of applied physics on the other (Palmer, 1977). His conviction that manual skill was of great value and that boys learn best by doing remained a central part of his philosophy as an educator. While no explanation is provided as to how manual skills and human learning were related, the relationship, according to Palmer, characterized Sanderson's philosophy:

> It seems that at this stage [Dulwich College, 1885–1892] in his teaching career, Sanderson did not have the conviction that became the hallmark of his work later at Oundle, that the greatest value of such work [mechanics in the workshops] was the spin-off effect it created from an educational point of view. . . . Mechanics classes provided instruction in theoretical mechanics, nature of materials, theory of structure, kinematics of machines, dynamics of machinery, and the use of tools (p. 124).

A quote from a personal evaluation report done on Sanderson's teaching in engineering written by Carey Foster (a contemporary) underscores the premise behind Sanderson's experiential learning theory:

> I believe that the work of this class [Sanderson's class of students] is of a very great educational value, as it is evident that the boys are not merely passively receptive of knowledge forced into them, but they are accustomed to exert their own minds actively upon it. They seem to be learning the most important of all intellectual acquirements – how to get knowledge for themselves (Foster, cited in Palmer, p. 127).

In the spring term, the senior boys of Sanderson's school were given an opportunity to participate in what were called 'conversaziones'. These were divided into divisions: physics and mechanics; chemistry; biology; and workshops. The students chose for themselves which conversazione they wanted to join. Freebairn explains:

> Some of the experiments chosen required weeks of preparation; there was apparatus to be made and fitted up, information to be sought and absorbed, so on a final day an intelligent account could be given to any visitor watching the experiment. This work was all done out of school hours. Four or five days before Speech Day (the last day of Spring classes), ordinary school lessons ceased for those taking part in the conversazione; the laboratories, class-rooms, and workshops were portioned out so that each boy knew exactly where he was to work, and how much space he had. The setting up of the experiments began. To anyone visiting the school on these particular days, it was a state of utter confusion, boys wandering about in all directions – apparently under no supervision – and often, to all appearances, with no purpose. A party might be met with a jam jar and fishing-net near the river; others might be found miles away on bicycles, going to a place where some particular flower might be found. Three or four boys would appear to be smashing up an engine and scattering its parts in all directions, while others could be seen wheeling a barrow-load of bricks or trying to mix a hod of mortar. Gradually a certain amount of order appeared, some experiments were tried and found to work satisfactorily, others failed and investigation into the cause of failure had to be carried out. As the final day approached excitement increased, frantic telegrams were sent to know if the 'liquid air' had been despatched, frequent visits to the railway station were made in the hopes of finding some parcel had arrived; sometimes it was even necessary to motor to Peterborough to pick up material which otherwise would arrive too late. A programme giving a short description of the experiment or exhibit had to pass through the printer's hands. At last everything would be ready; occasionally, but very seldom, an experiment had to be abandoned or another substituted at the last moment (pp. 9, 10).

THE OLD MAN

Early editions of the school magazine (The Old Oundelian) suggest that, while Sanderson's first few years were fierce and bitter, his impact on the school, and on the boys, was considerable; workshops, a photographic society, a revival of the literary and debating societies, a science society, natural history outings, and the institution of a choral society. Later came agriculture and a school farm, drama, a school play every year and, on the music side, an Oratorio in the Winter term. Sanderson had a clear concept of what he wished to achieve – gradually he began to convince some of his staff and appointed new masters who shared his views. One of his masters (there are many to be quoted), made an interesting reference to his leadership skills. 'It is possible he would have found his earlier years at Oundle easier if he had been more articulate' (cited in Freebairn,

p. 12). Apparently Sanderson's efforts to build a following were often thwarted because he failed to explain the purpose of the changes he made. He was unpersuasive. One issue of the Oundelian magazine suggests he found words 'an obdurate medium to the end'. His passion for an unbridled human development philosophy, however, was resolute. He believed 'boys in the mass were sound at heart'. According to Freebairn, he did not consider them to be angels, but the master's job was to be vigilant and not to give, more than could possibly be helped, opportunities for going astray. Sanderson was convinced that it was important not only to trust a boy, but to let him see whether you cared if he did the wrong thing, cared whether he worked or was idle. Such an attitude made all the difference to the boy. If the master cared, the boy soon came to care, too. When keenness and interest in one area begin to influence and inspire other work, then real education may said to have begun.

Eventually, according to Freebairn, Sanderson came to be known by the students at the school as 'The Old Man'. Secreted beneath their humorous appreciation was the most passionate respect: 'their close apprehension of his quaint rich turns of thought gave that sense of personal possession which is of the very substance of love' (Freebairn, p. 13). He [Sanderson] would admit that there might be such a perversion as a bad man, but he refused to believe in the possibility of a bad boy. It was a waste of time for any person to approach him with the object of blackening a boy's character; it produced about as much effect as beating a granite cliff with one's bare hand.

Among other unique traits, Sanderson had a genius for discerning which subjects of study would further a boy's development and a curriculum was devised to meet it, often to the boy's mystification. Wells, whose two sons were educated at Oundle and who was present at Sanderson's death, had great admiration for him.

> I think him beyond question the greatest man I have ever known with any degree of intimacy. He was himself a very delightful mixture of subtlety, simplicity, generosity, adventurousness, imagination, and steadfast purpose. I saw my own sons get an education there, better than I had ever dared hope for them in England (p. 24).

A SANDERSON PROTÉGÉ

An article in the 1995–1996 Oundelian magazine provides evidence that the Sanderson legacy lives on, but marginally so. The following excerpt from the Old Oundelian [School Alumnus Magazine] provided an indication that a Sanderson protégé might be active today.

'100 Years of Motor Engineering'

> Technology and engineering have always maintained a high profile at Oundle and there have been further developments in that quarter. The building of a low-cost sports car (nicknamed Locost') to the project leader's own design continues apace, so much so that we have had to rent a unit on an industrial estate for the latest enterprise which is the con-

> struction, in conjunction with the former chief designer of the Aston Martin Lagonda, of a new concept sports car which will be faster than almost every car on the road. This is a striking project, a fine example of the true concept of Design Technology since it links various departments within the School and uses materials presently used only in space shuttles and one or two top Formula One Racing teams. Our group of tomorrow's engineers, following in the footsteps of Old Oundelians such as Raymond Mays and Amherst Villiers [alumni and leaders in the British automobile industry], contains both boys and girls (1996, p. 9).

Reference made to the project leader responsible for the motor engineering program piqued the author's curiosity and prompted a meeting with this educator/technologist. What better opportunity to visit this particular teacher and explore the Sanderson philosophy on teaching at the same time, I surmised. My training in engineering and early career in motor mechanics would surely make for a common professional interest, if not a teacher socialization case study; teacher socialization research that had brought me to England. Does the Sanderson legacy live on as the 21st century draws to a close? The following narrative account of the interview between the coordinator of the sports car project and the author explores this question.

> *As I think about the Oundle workshop in which I interviewed Roger (a pseudonym) and the affection with which he referred to every aspect of the custom sports car each student in the class built, Ortega y Gassett's (1962) definition of technology crystallized for me (Gassett defines technology as the extra-natural program that is man himself). This man is programmed, I concluded, to design and build motorized vehicles! These sports cars, there were about six of them in various stages of completion, did not resemble the handiwork of beginners. No, there was a finish, a quality, that was more reminiscent of an auto show display. There is something more to this, I thought. There is a master plan for this project which incorporates much more than designing and building a car.*
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> *It turns out Roger had no training as a teacher, but had instituted a plan which was simple and uniquely effective. Each student who entered his workshop had to work under the tutelage of a senior student for the first year of the project. This time period gave the newcomer a chance to build a repertoire of skills and knowledge. It also gave the more senior student the assistance needed to complete the onerous project. In the process, the senior and junior student both learned what it meant to be a leader and learner, respectively. The commitment needed to plan and complete a project of this magnitude is not to be underestimated (I knew this from experience). I couldn't help reflecting about how Sanderson had conceived of this methodology 100 years earlier when he ensured that whenever the students worked in the labs or workshops they were free to do so for long hours at a time and within a co-operative rather than competitive environment. He actually cancelled or postponed regularly scheduled classes so students could work on their projects for a week at a time. Yes, there is a master plan at work here, I mused. From Roger's point of view, he knew exactly what it took to nurture a project of this nature from design to finished product, not to mention the judgement required to connect each student to a learning situation. He had the same genius as Sanderson when it came to matching up a student's needs with the curriculum. What is the genesis of this ability, I wondered.*
>
> *The attraction to technology and to mechanics for Roger was something about which he paid little attention as a youth. His first recollection of an interest in mechanical things was as a fourteen year old when he helped his uncle take an automotive engine apart. The precision with which his uncle analyzed, cleaned, and stored each part of the engine was intriguing, he remembers. Why does every part have to be analyzed he thought? What is the problem with the engine? When will the car be ready to drive? These*

questions, in retrospect, were to propel Roger into a career in which his own expertise and love for mechanical things would grow, even flourish.

After graduating from high school Roger took a job with a local auto dealer in his home town as an apprentice motor mechanic. He completed his apprenticeship but found himself to be restless about routine maintenance and troubleshooting kinds of work. The desire to experiment with new engines and chassis configurations is what stirred him. Fortunately he was able to change employers and soon found himself working in a small but challenging research and development lab of an automaker in England. Here, his desire and capability was put to good use on a regular basis. On one occasion his supervisors asked him to put an engine from a completely different product into one of the company's vehicles. 'Can you have it done within a week?', he was asked. Sure enough the one week deadline was met and the first eight cylinder engine to be installed in his company's line of cars was ready for testing. The next years of his career, needless to say, were rich with opportunities for experimentation and success.

Roger knew from his work and life experience how practical problem solving and learning were/are related. Technology, in a way, is a means to an end. It is also a way of knowing or learning. It is existential, a natural and instinctive process. Roger and I didn't talk in these terms. We knew from each others questions and actions during the tour of the workshop that our discourse was unique, our perceptions similar. Roger and I were using a common language that was a part of our respective identities. Our speech and movements were discursive as well as non-discursive in nature. We had learned to communicate and value experience from the physical and material worlds. We shared a common belief in learning through experiencing, i.e., by doing. Our working lives were about techniques, means, and perceptions. But what does the interview and our penchant for the mechanical world have to do with a practical curriculum and with how children learn, I wondered.

I knew from my own teaching experience that the identity of many young people in school is tied more to personal experience, e.g. home and community life, and sensing, rather than to abstract memorizing of signs and symbols. I also knew from my own studies that the acquisition of knowledge and understanding was an active as well as passive exercise and therefore not acquired in abstract isolation from practical experience. Book studies by themselves were not the only way to build a knowledge base.

Roger's expertise within his company had eventually come up over lunch in a conversation between the headmaster (school principal) at Oundle and a senior official from the company where Roger was employed. Interestingly, this was the same headmaster I met while at Oundle. Is it possible the affection and commitment to technology Sanderson had shown in his policies and practices was at work here? Now? Were those values and the philosophy which embraced a practical curriculum taught by experienced artisans in practice today? Did the headmaster believe in the experiential learning philosophy and was he perpetuating it by hiring Roger? The similarities between Roger's convictions to a unique set of human development and problem solving principles and Sanderson's would certainly be evident.

From a curriculum policy and practice viewpoint the technological education curriculum development initiatives under way in so many countries around the world need to be examined and analyzed carefully, I discerned. The rationale for those initiatives has an element which could either distinguish or discredit the field for those who are wishing to understand its value and place in the school curriculum. The distinctiveness of such curriculum is in its relation to human learning tendencies and individual identity. The political nature of such initiatives aside, technological education is important because it helps us understand ourselves, in particular, how we learn, our tendencies for learning. A body of research that explores the importance and place of an experiential learning ethic in schools does need to be critically examined, I thought.

Roger eventually met with the school principal and was hired. In my meetings at Oundle, the real irony of the Oundle history became evident. Roger's experience and maturity had rewarded him for a position at Oundle; he is currently on a contract, but

> *not as a technology teacher. At the time of my visit, his role in the school was as a leader for an extra-curricular activity. The workshop which had the longest waiting list of students at Oundle was not a part of the regular curriculum! The excerpt in the magazine (quoted earlier) about the sports car project was a concerted effort by Roger to have his achievements and curriculum valued and recognised in face of the classic curriculum. How many other technology teachers/supervisors or teacher assistants are in a similar circumstance?*

Since my visit to Oundle two initiatives have been announced. First, automotive engineering is being accorded a higher status – the school is making it an examinable subject. Second, a complete renovation of the workshops, including the addition of an automotive engineering building, is underway.

> It is the School's single biggest project at present. We are investing a huge sum in new facilities . . . partly through the generosity of an Old Oundelian' (Sharp, 1998).

The lesson which emerges from the biographical and historical analysis at Oundle surrounds how to balance the school curriculum and help teachers meet the learning needs of students. Roger's workshop, the most popular of all the extra-curricular activities in his school, was an awkward program' within the mix of school curriculum, formal and informal. One hundred years ago Sanderson mandated that every child spend one full week of each semester immersed in practical mechanical activities. Decades of resistance by teachers from the liberal arts tradition (then and now) reduced the annual time allotted to such activity to three days a year and then to an extra-curricular status. The more classic school subjects that fit readily into the academic milieu continue unchanged and unchallenged.

Technology, like many practical school subjects, has been and still is a peripheral curriculum area. One prospect for change in that status may rest in a better understanding of what it means for a child to experience learning as Sanderson described it. Layton (1996) recognizes the value of a practical curriculum and cautions educators about overlooking it. 'We would do well not to underestimate the extent to which technology confronts hallowed educational theory, policy, and practice' (p. 4). Explicating and embellishing the relation between individual development and an experiential curriculum may only be possible when we listen for the modest voices of the Sandersons and Rogers within the schools.

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