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## Whole language and design and technology education

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### Abstract

*The "Whole Language" movement has swept American elementary education over the last three or four years. Whole language refers to an approach to teaching that is highly integrative and thematic, where children learn language skills in the context of real-world problem-solving activities.*

*Concurrent with but isolated from whole language have been two other major educational movements, one to reformulate education generally in terms of "outcomes" and one to update the content and delivery of technology education.*

*Outcomes-based education requires progression toward adult outcomes starting with the earliest school experiences. One adult outcome generally agreed upon is technological capability. To many people this implies a need for kindergarten-to-twelfth-grade (K-12) technology education.*

*In the US, technology is closely associated with science, a considerably weaker area of the elementary curriculum than language. Technology education is a daunting new idea to elementary teachers, the more so when associated with science. Whole language, however, provides a comfortable entree for technology into elementary education, since it can be seen as a logical extension of thematic problem-solving into the realm of practical activity. To date, little effort is being made to take advantage of this natural connection.*

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Several years ago I spoke to a friend from my college days who teaches kindergarten and whom I hadn't seen in some time. After a quick recapping of the past five years she asked me just what this design and technology education that I'm involved with was all about. I gave her my 250-word summary of the field as I see it, and she said "Oh - we're doing the same thing. We call it whole language."

I was intrigued by this bit of information and set out to find out more about the subject. I found references to "whole language" starting in the early 1980s in American journals like *Language Arts* and *The Reading Teacher*, later to be joined by "whole literacy" and some other variations. My first impression was of an integrated approach to learning in which students are introduced to language through literature. The revolution in this reading style seemed to be based on the idea of reading to and then along with young children from stories that they enjoy, rather than systematically drilling them in rules of pronunciation, reinforced by basal readers ("See Jane run...") and workbooks ("Circle the words that rhyme with...") Really interesting literature would encourage children to *want* to read, and this would impel them to learn enthusiastically, with a sense of purpose.

Of course there was more to it than that. According to an article in *The Journal of Educational Research* from May/June 1990, whole language teaching requires more than a theoretical orientation and a

collection of Dr. Seuss. Effective programs are engineered to create a rich and holistic environment. They require new allocations of time, access to a great variety of teaching strategies, art and constructional materials and tools, and new assessment strategies, just for starters. In fact, the description of a whole language program went far beyond the limitations of the name. Much more could be fostered in such a setting than "just" language development.

As my investigation continued, I could easily see the connections my friend had made between my description of design and technology and her vision of whole language. Only recently, however, has much attention been given to technology education for elementary students in the U.S.

Outcome Based Education (OBE), a curriculum design approach with considerable momentum in the U.S. right now, requires the identification of adult competencies and a progressive plan for providing them to school graduates. Many states engaged in OBE projects have identified technological capability among the critical competencies for *all* adults, and most of these have come to the conclusion that this can only be achieved by starting technology education early. But the vision of elementary technology is hazy at best. Few people, it seems, have recognized the opportunities presented by the whole language movement for integrating technology education into the

elementary curriculum.

In my research, one article that attracted my attention was titled "19 Ways to Misread Whole Language." In it, authors Judith Newman and Susan Church examined some misconceptions about what they describe as a philosophy of learning rather than a new teaching method. I found articulating misunderstandings to be an ingenious device for introducing the tenets of the whole language philosophy to design and technology educators. It strikes a chord for us because it parallels some problems we have in explaining our own field. Reference to this article has proved useful in talking to secondary teachers about my own impression that whole language may provide an ideal inroad into elementary schools as we face the challenge of creating a K-12 discipline called technology education.

### 19 Shared Misconceptions about Whole Language and Design and Technology Education

The initial mistaken notion cited by Newman and Church in their September, 1990 article in *The Reading Teacher* is about conceptual frameworks: **phonics are not taught in whole language.** For the lay person, phonics are the rules of pronunciation that allow us to give voice to words based on their spelling. Phonics enable us to "decode" strings of letters into auditory units that possess or can be given meaning. In effect, they allow us to sound out words. Newman and Church explain that phonics are certainly taught in whole language, but not as something separate from reading and writing. Rather students begin from their first school days to hear and even read stories, with spellings, pictorial clues and spoken words all contributing to a growing awareness of letter sounds - in context.

Phonics provide a mental strategy for moving from the familiar to the unfamiliar. Conceptual frameworks about technology develop the same way, starting with our earliest learning about the behaviour of materials. When teachers encourage pupils to design and make objects and environments using materials and tools and monitor children's development of conceptual frameworks about structures and movement that help them decode unfamiliar situations, they are engaged in technology education. As with phonics in whole language, technological concepts in technology education emerge in context rather than being "front-loaded."

Another misconception about whole language is that **technical skills, like spelling and grammar, are not taught.** The authors point out that such skills are a means to an end — the capability to

communicate. If children are challenged to communicate meaningful messages in increasingly challenging ways, they will acquire the skills they need, either by independent discovery or by demanding - and paying attention to - information from the teacher. In other words, while short focused lessons at critical points are perfectly appropriate, spelling and grammar rules are not presented separate from the need to apply them.

The same criticism is levelled at technology education, especially from traditional teachers in retraining who cannot conceive of beginning an activity without detailed lessons in all the procedures to be used. This approach only works if the activity of the students is so highly structured that every operation is prescribed. In open-ended design work, students may use a variety of techniques to achieve their ends, and they'll never get to designing if they must sit through lessons on all the skills they might possibly need before being allowed to identify a problem.

That **whole language means literature-based curriculum** is a misunderstanding similar to the ideas that "technology education means industry-based curriculum" or "technology education is about computers." Newman and Church point out that the ability to communicate can be fostered through "curriculum planned around maths, science, and social studies." While whole language teachers do not limit their activities to any single theme or approach, they do require that activities be meaningful, age appropriate and full of opportunities for a variety of hands-on experiences for the wide range of students in any class.

Because the word technology is often encumbered by impressions of complicated hardware, esoteric knowledge and male-dominated work, it is even more critical to clarify the nature of the discipline than is true for whole language. After all, just as language opportunities can be found in the study of any subject, technology can be seen to pervade virtually all areas of human endeavour. Unless teachers understand technology in its broadest terms, they may be limited in the kinds of contexts from which they envision technology activities developing. Especially at the elementary level, stories, songs, current events, and observations of the near environment provide opportunities for insight-building designing and making. Therefore, literature is as legitimate a focus for a design and technology activity as "robots" are an opportunity to explore language.

A further misconception cited is that **whole language is a way of teaching language arts and doesn't**

**apply to other subjects.** As the authors go on to describe the philosophy of whole language, it is clear that the vision they refer to is essentially design-based learning with “many opportunities for learners’ active involvement in solving meaningful problems.” This learning encompasses “exploration with concrete materials,” “carrying out investigations,” and “using oral and written language as well as other communication systems.” Obviously, this approach is broad enough to encompass all kinds of subjects.

To the extent that elementary teachers envision themselves as more than language teachers, they naturally integrate and take responsibility for the students’ learning of other important content. A teacher who envisions her or himself as a design and technology teacher sees that critical understandings and experiences in design and technology are not missed. Design and technology, meanwhile, is also integrative in nature. Upper level technology teachers need to view their field broadly and continue to reinforce the holism fostered in elementary school.

One of the most superficial misconceptions about design and technology education seems also to plague whole language proponents; namely, that in a **whole language classroom, teachers don’t have to teach.** Newman and Church go to considerable lengths describing the many alternative roles to “sage on the stage” that are required of a whole language teacher. They describe the need to create an atmosphere for directed but open-ended problem solving, including gathering all kinds of resources for independent activity - books, magazines, computer hard- and software, constructional materials and tools, and motivational items. Guiding, shaping and monitoring individual progress, somewhat trickier when pupils are encouraged to act as creative individuals, require full-time vigilance and challenge the teacher to be continually adaptable and resourceful.

A virtually identical shift is described by traditional secondary teachers who take on the role of design and technology teacher. Accustomed to knowing and providing the answers, technology teachers often cite the challenge of directing the responsibility for “finding out” back onto the student. Only if teaching is defined as direct transmission of knowledge can either whole language or design and technology educators be accused of not having to teach.

Following hard on the heels of the “no teaching” image is the idea that a **whole language classroom is unstructured.** Whole language classrooms are

highly structured in terms of both time and space, with both teachers and students contributing to the organization. This structure is rarely compartmentalized or symmetrical, however. The teacher must think about placement of furniture, choice and location of resources, grouping of students, nature and flow of activities, allocation of time and presentation space. Student input is encouraged and flexibility in time-frames permit student suggestions to be optimized, without losing sight of the larger goals of the curriculum.

A design and technology setting must be, if anything, even more structured than a whole language classroom. At each level, hands-on work becomes more elaborate, and more space is needed for storage of tools and resources, carrying out designing and making, storing work in progress and displaying projects. In addition, clean and dirty work areas must be provided, and time allowed for intensive involvement and adequate cleanup. Health, safety and noise considerations inherent in advanced designing and making activities demand exceptional organization in the secondary technology lab.

To the charge that **there is no evaluation in whole language,** Newman and Church respond that “teachers with a whole language perspective observe and interact with students to discover not only what but how they’re learning.” Information gathered allows whole language teachers to plan future instruction and to communicate progress to parents and other educational professionals face to face or in written narratives.

In design and technology education, the need for alternatives to normative and objective testing is also clear. This becomes more critical at the secondary level as testing becomes more rigorous, standardized and objective. The end product of design work will tell only a portion of the story of the student’s learning. To further complicate matters, in open-ended work each student may take a completely different approach to a given problem. Design work is intended to foster thinking skills — investigation, creativity, planning, critical judgment. Some educators even envision tapping another domain having to do with motivation, will and the sense of agency. Few of these qualities can be judged at a single moment in time, with a standardized test, and judged against established norms. Criterion-referenced evaluation, using teacher observation, student self-assessment, performance, portfolios and other kinds of demonstrations are among the emerging means for evaluating learning in both design and technology education and whole language.

Some critics claim that **in whole language classrooms there are no standards**. But “when the focus of learning is the construction and communication of meaning, standards are intrinsic” state Newman and Church. Trained whole language teachers continually raise standards and “encourage learners to impose increasingly demanding expectations for themselves.” Once again, this argument is more feasible at the elementary than the secondary level.

Solutions to technological problems too have intrinsic standards such as fit, function, economy and aesthetic appeal. Additional evaluation criteria are set in the specifications for each design brief. Like whole language teachers, good technology teachers develop increasingly challenging design activities whose requirements engage students with the necessary content as required.

Without doubt, **whole language teachers are more concerned with process than product** - but products intended to communicate must certainly do so. The authors point out that “taking some projects through to completion helps students learn strategies for making sure their intended meaning is clear, conventions are followed, and the format is attractive and appropriate - but not all work needs to be perfected.” A whole language activity may, for instance, focus on one formative skill, such as *“fluency* - discovering and articulating ideas.”

Although “fluency” is not a term often used in technology education, the explanation provided by Newman and Church correlates directly with the idea-generation and solution development that we recognize as part of the design process. The charge is also leveled at technology teachers that the emphasis on process has destroyed the integrity of the end product. We often find ourselves defending the need to reallocate time in order to give increased attention to the thinking skills which will allow students to solve wide ranges of problems rather than drilling them in techniques appropriate for a single project.

Both craft and industrial arts, the major precursors to technology education in our two countries, judged students’ success upon technical criteria applied to a physical product. This approach supported the vocational needs of graduates undertaking unit and mass production jobs throughout the industrial era. In the post-industrial age, with fewer and fewer people directly involved in manufacturing goods, specific skill development is inappropriate as a means of evaluating design and making, and certainly does not get at many of the broader values of technology education. Whole language and

technology education share a process-oriented perspective that re-evaluates the role of the end product and requires new standards and assessment techniques.

The presumption that **whole language philosophy applies only to teaching children in the early grades** is reflective of a limited application of the term to elementary reading and writing skills. The authors suggest that a design-based approach is equally suited to more advanced communication skills and other skills as well. Design-based teaching in technology has spread from the upper grades downward, starting first with an examination of professional designers in a variety of fields. The recognition of designing and making as the natural activity of human beings throughout their lives is really the basis for the convergence of many educators upon design as educational approach.

Some critics speculate that **whole language won’t work for kids with special needs**. To refute this assumption, the authors reiterate their description of the structured “open” classroom in which individualized, independent learning is the norm. Clearly, if students have failed to learn effectively in other settings, the idea of a personalized, varied, hands-on, non-norm referenced approach holds considerable potential. In fact, say the authors, many children who have given up on school begin to “see themselves as learners” in a whole language setting.

Technology teachers, too, help students identify problems appropriate to their abilities and customized to their pace of learning. The hands-on orientation of technical courses has always been a mainstay of the less academically successful. With the emphasis on thinking skills, the technology lab becomes a richer setting for those students and an intellectually challenging arena even for gifted pupils.

Allegations that **there is little research to support whole language** are typical of an emerging discipline. Whole language is relatively new, but according to Newman and Church, many of its tenets are based on research in curriculum, psychology, anthropology, philosophy, and child development, as well as literary theory and linguistics. (Longitudinal studies on the effectiveness of whole language itself are just now beginning to emerge.)

Certain roots of design and technology education can also be traced to the social sciences and educational research, like whole language, but also to work in design theory as it relates to both art and industry. Much research in design and technology

is currently underway, as is clear from the DATER gatherings and publications, recent projects like those of Peter Sellwood and Richard Kimbell in the UK and a number of studies in the U.S. and other countries.

Proponents do not consider that **whole language is a teaching methodology**. The authors prefer to designate their subject as a philosophical viewpoint from which methodology is dynamic and continually evolving. As in design and technology, the teacher is always learning and always adapting the setting and problems to the needs of the students. Therefore, many different teaching strategies may be used to get at similar concepts for a variety of students doing individualized work.

Several misconceptions cited by Newman and Church are closely interrelated. They reflect a serious flaw in the thinking of both teachers and administrators. Among these is the impression that **all you need for whole language is a commercial program**. As in American technology education, many educational suppliers have taken the tack that teachers are too busy (or simply do not want) to think. On this assumption they have attempted to provide "turn-key" programs in both whole language and technology. Newman and Church point out that "the danger of adopting a commercially prepared reading program is that teachers apply sets of procedures rather than structuring appropriate experiences for their particular students." The same is true for technology education. In fact, in both whole language and technology education, even text books are beginning to seem inappropriate and are often rejected in favour of reference books, resource centres full of a variety of media, and at the upper levels, custom published anthologies of timely and topical articles.

It is also untrue that **giving teachers a few tips makes them whole language (read: technology) teachers; that you only need a few in-service sessions to change teaching practice; and that changes reflective of either discipline affect classroom practice, but for administrators it's "business as usual."** Since design-based or process-oriented learning, the hallmarks of both whole language and technology education, require a virtual paradigm shift, change requires time and commitment from all involved. "Tips" like turn-key program packages, "perpetuate unreflective teaching and misrepresent what is involved in creating a learner-centered classroom," caution Newman and Church. Teachers involved in such fundamental change need exceptional support from administrators, not just in making time and training available, but in making a case to schoolboards and

regulatory agencies that old standards may not be appropriate and alternative assessment methods should be tried.

Misconceptions that **there is only one right way to do whole language** and that **whole language is only for super teachers**, are also closely related. The second appears to be a drastic overreaction to the first - but both are familiar to the technology teacher. The former exposes a belief that learning is much less complicated than it actually is. In fact, every question of instructional procedure depends on the resources at hand, the history of the people involved, and even administrative and community precedents. The "right" way to do whole language - or any design-based teaching - is to be sensitive, flexible and judicious. In other words, it is necessary to take risks, as design and technology teachers discover when their students ask specialist questions they simply cannot answer. But risk-taking is not the hallmark of a saint or super teacher. It is a capability of all teachers who truly want to see more children learn more and enjoy the process. It requires support, collaboration and respect on all sides.

I felt the need to elaborate the connections between whole language and technology education for several reasons. First, current OBE work suggests that design and technology education differentiated from other school disciplines is necessary for creating technologically capable adults. While this does not imply that it cannot be integrated with other subjects, understanding, creating and using technology must be given explicit attention.

Second, if all students are to leave school technologically capable, they must start on the process early and efforts must be made not to discourage them along the way. Therefore, technology education in the U.S. must be seen as a K-12 endeavour.

Third, if technology is to be taught in elementary schools, it should be seen as a part of the increasingly integrated experience of the children. For this reason it should be delivered by the classroom teacher in the context of other learning and not be the domain of an outside specialist.

Fourth, if elementary teachers are to envision themselves as technology teachers, they will need a great deal of help. Most of them have had little or no training in the language, skills and frameworks of technology. In-service of current teachers must be copious and initial training of elementary teaching must change radically.

Five, the momentum of whole language seems an ideal entree for technology into elementary schools. Secondary technology teachers (and educational publishers) in the U.S. are far more likely to associate technology with science than with language, social studies and the arts. Therefore, they tend to assume that technology can be most easily taken on board by elementary teachers as an extension of an existing part of the curriculum - logically science. But science is a notoriously weak feature of the elementary curriculum in U.S. schools. Trying to introduce technology through science may create more problems than it solves. On the other hand, most elementary teachers feel both comfortable with and committed to language - seeing it as the basis for concept development in all fields. The individual and group problem-solving, hands-on activities and personalized learning inherent in whole language is perfectly compatible with design and technology. And since appropriate tools and materials are much the same as those used for art and craft work at this level, orientation to technology for elementary teachers can start by enriching their vocabulary and putting familiar materials and tools within new frameworks. The power of language can build ownership and provide the comfort to branch out into more "technological" activities - very possibly even resulting in increased confidence with science.

Because the British primary curriculum has been more thematic and less fragmented than its U.S. counterpart for some years, the tenets of whole language may seem unexceptional. But for U.S. elementary education, technology needs serious sensitivity and support. Whole language may be its route to acceptance.

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