

**Beyond Worksheets:
A Social and Holistic Approach to Numeracy**

by

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Practitioner Summary

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How did this project come about?

For several years, Ontario literacy practitioners have requested more professional development and resources to support numeracy instruction in their programs. In response to this need, Metro Toronto Movement for Literacy (MTML) initiated the “Beyond Worksheets” project. The purpose of the project was to develop an approach for contextualizing numeracy instruction in adult literacy and workforce literacy environments.

The project included scanning the literacy field to determine practices in numeracy instruction, reviewing recent literature on numeracy teaching, and learning and offering workshops on the approach in order to gather practitioner feedback.

As a result of our review, we gathered much information and insight primarily from three current research reports – two from Ontario and one from Australia:

- *Supporting Learning, Supporting Change: A Research Project on Self-Management & Self-Direction*, Ontario (K. Grieve, 2003)
- *Frameworks for Adult Numeracy Education: a Survey and Discussion*, Ontario (L.Hagedorn, 2003)
- *Numeracy in Practice: Effective Pedagogy in Numeracy for Unemployed Young People*, Australia (B. Johnson et al, 1997)

We found two excellent Australian sources that promoted a contextualized approach to adult numeracy learning as social practice through holistic learning:

- *Certificates in General Education for Adults*, Australia (J. Hagston et al, 2002)
- *Rethinking Assessment: Strategies for Holistic Adult Numeracy Assessment*, Australia (B.Marr, S. Helme, D. Tout, 2003)

What does our approach look like?

The proposition

Our approach is based on the proposition that numeracy learning and teaching can best be provided through a social and holistic approach. This is based on the principle that the learner is a whole person and that mathematics is a human construction.

The first perspective of our approach intertwines two main concepts.

To meet the needs of adult learners in literacy programs; many leading adult educators advocate learning as social practice and holistic.

Numeracy as Social Practice

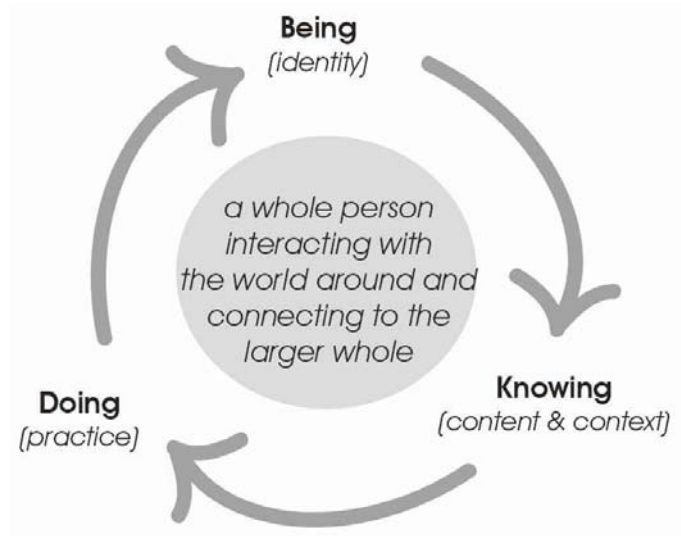
When looking at numeracy as social practice, skills are not developed in isolation, but in the context of, and in response to the learners' social environment. The environment could be a workplace, an educational setting, or a daily life situation.

Numeracy Through Holistic Learning

Holistic learning takes into account the whole person involving the mind, body and spirit. A learner will move towards a greater sense of confidence and self-awareness in using mathematics. It is learning that is both active and reflective. It creates meaning in daily activities, provides time and space to reflect on the learning, and to make personal connections throughout the process.

The second perspective to our approach is a schema of learning that sees the search for identity at the core of learning.

The central principle of this schema is that a learner is a whole person — mind, body and spirit — interacting with the world around and connecting to a larger whole.



We look at learning as:

Being (identity)

- becoming self-aware in using mathematics
- gaining confidence as a ‘numerate’ person
- making personal connections throughout the learning process

Doing (practice)

- choosing relevant information
- applying appropriate skills and strategies
- reflecting on the learning and the results

Knowing (content & context)

- generating mathematical problems, skills or procedures
- employing mathematical content and techniques that:
 - vary according to the situation
 - depend on the purpose and context in which the numeracy takes place
 - create meaning in daily activity

The third perspective focuses on the goal and method of the approach.

The primary educational goal is a shift in identity towards a numerate individual who makes meaning of the world through mathematics.

The method of the approach is not simply to apply mathematical procedures, but to generate mathematical content and procedures in real world contexts through active learning and reflection.

What does this approach look like in everyday practice?

Assessment

The learner's knowledge, experiences and daily life situations will guide the learning activities. It is essential to gather this information through an assessment process. We suggest an open-ended, guided conversation between the learner and practitioner. The practitioner listens carefully and uses a blank sheet of paper to make notes as the learner reflects on the mathematical skills and knowledge used in everyday life, as well as goals, interests and attitudes. We call this assessment technique the "blank page assessment."

Techniques, Strategies and Activities

We suggest some specific techniques, strategies and activities that a practitioner might use in a social and holistic approach to numeracy. Following is a non-exhaustive list in random order:

- Start with the knowledge and interests of the learners, including the maths methods they already use and know.
- Address and evaluate attitudes and beliefs regarding both learning math and using math.
- Teach in a context that is of interest to the learner – start with a context and move into skills/theory.
- Use a cooperative approach to activities – work in groups, on projects, investigations and tasks, etc.
- Connect to the outside world – including people who know and use different maths.
- Build self-esteem and confidence in maths – encourage success, and fun too!
- Engage learners in problem solving via investigations or projects involving "real life" mathematics.
- Try to experience the problem, relate it to the personal world, clarify language, create context and remove ambiguity.
- Encourage questions that are critical of the use of specific mathematics
- Search for differences among theories and patterns that are similar.
- Encourage reflective and personal thinking.
- Help learners make meaning – share mental images that the problem brings to mind.
- Help learners see multiple methods and approaches.
- Engage learners in whole group, small group, and individual activities – this is also how the math skills are taught and practised.
- Discuss historical and cultural understanding of the use of mathematics.
- Encourage learners to discover and invent new knowledge and have an opportunity to practice what they have learned.
- Incorporate learners' intuitive solution methods, especially combined with opportunities for learner interaction and discussion.
- Encourage learners to become problem-solvers in a wide variety of situations and to view mathematics as a discipline in which thinking is important.
- View computation as a tool for problem-solving, not as an end in itself.
- Encourage the development and practice of estimation skills.
- Provide opportunities to explore mathematical understanding with concrete and visual representations, and hands-on activities.

How will Ontario adopt and implement a social and holistic approach to numeracy practice?

By Re-examining Goals

Goals of a learning program will start with the learner – front and centre.

By Holistic Assessment

Assessment will be authentic. Assessment tools and techniques like the “blank page assessment” will be developed by learners and practitioners together, directly relating to goals of the individual’s learning program. The practitioner will learn about the whole person. We highly recommend that each program acquire “Rethinking Assessment,” a resource with an approach, methodology, and activities consistent with our approach.

By a Fluid and Cyclical Learning Process

Numeracy teaching and learning will be a fluid and cyclical process not bound by a set of rules and procedures. Each phase in the learning process will be totally dependent on the context of the learner.

By Innovative Curriculum

Policy makers and curriculum developers will need to embark on a cutting-edge curriculum based on a model such as the Australian CGEA.

By Collaborative Development of Learning Materials

Materials development will follow a collaborative model as described by Hagedorn (2004) in her report, “An Exploration of Collaborating Materials Development in Adult Numeracy Teaching.” Literacy practitioners, along with a numeracy resource facilitator, would work together to develop and adapt program resources. This model would support practitioners in material development that is generated by the learner, contextualized, meaningful and relevant.

By Flexible and Accessible Program Delivery

Our schema of learning with the learner as a whole person interacting with the world around will require flexible learning and teaching environments. The opportunity for social interaction should be a central component of any program.

Specific to workplace numeracy, there is an urgent need to upgrade skills, but more importantly, to develop a more general mathematical understanding that goes beyond job-related tasks. Learning must enhance the worker’s knowledge of the entire working environment and life outside.

By Ongoing Practitioner Dialogue and Professional Development Opportunities

Professional development will reflect our social and holistic approach to learning in content and process. Opportunities will be provided to practitioners for reflection on current practice and their own belief and values system that motivate their practice. Practitioners will receive sufficient preparation in facilitating numeracy learning and ongoing professional development in areas of instructional techniques, materials, assessment, curriculum, as well as mathematical content and methods.