# A Social and Holistic Approach to Numeracy



Labour Education Centre in partnership with the Canadian Union of Public Employees and Workplace Education Manitoba

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# Canada

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# A Social and Holistic Approach to Numeracy

This booklet introduces practitioners and others involved in adult numeracy education to a social and holistic approach. It reflects the experiences of the two-year project "Numeracy at Work: A Social and Holistic Approach to Math as an Essential Skill" funded by the Office of Literacy and Essential Skills (2009-2011). The project was led by the Labour Education Centre in partnership with the Canadian Union of Public Employees and Workplace Education Manitoba.

In three provinces in Canada, pilot sites practised the ideas and concepts outlined earlier by Tom Ciancone, Joy Lehmann and Flora Hood in the publication, Beyond Worksheets: A Social and Holistic Approach to Numeracy (Metro Toronto Movement for Literacy, 2007).



**6** What stands out for me with this approach is the potential to make math meaningful. It's fun and it works. It's about understanding numbers for everyday life."

> – Reference Group Member

The project field-tested the integration of a social and holistic approach to numeracy learning into workplace and workforce literacy programs in British Columbia, Ontario and Manitoba. Over 30 adult What struck me about this project was the realization that this is as much about the holistic approach for the practitioners and what it gives them, as it is for the learners and the benefits it gives the learners."

> – Reference Group Member

educators participated in two full-day workshops. Practicum sessions took place after each module and the educators tried out the approach with learners. A 'summative forum' brought together educators and learners from pilot sites to share their field-test experiences with one another and to provide in-depth feedback on the approach.

A social and holistic approach sees numeracy as a part of life, for the whole person, within a social context. It emphasizes context rather than content, processes rather than skills, change in identity not just behaviour. It is a holistic approach, giving prominence to identity, relationships, context and meaning.

This approach to numeracy coincides and strengthens a workercentred educational process, learning which:

- is participatory, inclusive and deeply democratic in both its aims and objectives
- acknowledges and builds on the experiences and skills of workers
- involves hearts as well as minds
- promotes solidarity and respect among workers
- enhances workers' capacities for critical reflection and action
- links education with action in the world in a project of social transformation

# **Reflections on the Project**

Feedback from all stakeholders showed that on the whole, learners were much more engaged and receptive to math when they were involved in a social and holistic approach. The approach built confidence and excitement in both learners and practitioners in a way that a more narrow skills-based approach does not. The approach includes the affective domain and validated the learners' experiential knowledge of math. It moved math forward, related to their everyday experience and understanding of it. The approach moved instructors to be more in touch with their learners' real needs as a whole person rather than a set of skills or worksheets to be mastered or completed.

- From the Final Evaluation Report (page 12) prepared by Sue Folinsbee

Here is one practitioner's reflection on her personal experience in the project:



# What does a social and holistic approach look like?

A social and holistic approach to numeracy is based on the principle that the learner is a whole person and that mathematics is a human construction.

In their 2007 report, Beyond Worksheets, Tom Ciancone, Joy Lehmann and Flora Hood shared their thinking on what this approach might offer the literacy field:

We might envision the approach as an "interruption" to what practitioners are presently thinking about and doing in numeracy. It may provide a level of discomfort that may "mirror" or be identified with the discomfort that learners feel in dealing with numeracy issues. Through this approach there may be a space provided where there is an increase in the tension – to question what is happening and what could be happening in the area of numeracy. We are not providing a "quick solution" but rather [a way] to find out more about what and where the learner is and how to provide numeracy in a meaningful way.

From experience in the current project, we would add: for some practitioners, this may not be an interruption, but an affirmation of their current numeracy practice.

#### Numeracy as social practice

- people employ mathematical content and techniques that vary according to the situation
- people generate mathematical problems, skills or procedures depending on the purpose and context in which the numeracy takes place

# Numeracy through holistic learning

- learning takes into account the whole person the mind, body and spirit – interacting with the world around and connecting to a larger whole
- learning is both active and reflective
- a numeracy learner will move towards a greater sense of confidence and self-awareness in using mathematics, creating meaning in daily activities, reflecting on the learning, and making personal connections throughout the process

# 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.

Numeracy permeates all aspects of life from personal to work to spiritual."

Practitioner

# Concepts related to a social and holistic approach

- A Schema of Learning integrates aspects of being, doing, knowing
- Blank Page Assessment is an open-ended, guided conversation between the learner and practitioner
- *Ripple* looks at the inter-relation between the individual, their family and community and the wider world
- Model of Holistic Numeracy Competence uses a jigsaw illustration to portray the interlocking cognitive and affective competencies
- Task Process Cycle explains the steps used when solving a task or problem



One workshop participant noted that she had worked with a student who had been confrontational in class. When she asked him about his experiences with math and just listened, there was a transformation in his attitude because he felt validated. He totally got into the approach and liked journalling and wanted to talk all the time. He had his own concept of math. Both instructor and student journalled. The instructor said, "It pulled me into the basics of who I am as a teacher."

# A Schema of Learning

The schema embraces the notion of learning as social and holistic. A learner is a whole person — mind, body and spirit — interacting with the world around and connecting to a larger whole.



Learning is an interactive and interconnected process involving being, doing and knowing.

Here are some of the ways we see this in numeracy learning:

#### 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 and context)

- creating meaning in daily activity
- 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

# **Blank Page Assessment**

An assessment is the first step in working together to identify needs within a social and holistic approach. It is essential to gather information about a learner. 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."

#### Use a few prompts

With a few open-ended prompts, a guided conversation gives a practitioner valuable information about what knowledge a learner is bringing to the learning process. In addition, the practitioner finds out why the learner is coming to the program. A learner shares his/her story with a practitioner who is self-reflective and more fully aware of how to listen and receive the story.

#### Learners' "funds of knowledge"

Learners bring their own "funds of knowledge." Practitioners build upon this knowledge and recognize strengths. Practitioners look for gaps in knowledge, and create learning activities that support what is needed. It will help practitioners to identify, separate and link basic math concepts in a variety of contexts.

"By focusing on learners' funds of knowledge, we shift our attention towards what learners bring to our classroom when, together with them, we attempt to reconstruct their knowledge, attitudes, and understandings," says David Baker. "We look at what they can do as a whole person."

Following is a list of potential funds of knowledge:

- knowledge, experiences, histories, identities and images of themselves
- attitudes, dispositions, desires, values, beliefs, and social and cultural relations
- relationships with learning, teachers, and mathematics itself
- numeracy practices beyond the classroom

- David Baker, 2005, quoted in Beyond Worksheets: A Social and Holistic Approach to Numeracy, p. 17

The use of funds of knowledge in identifying goals and methods fits a holistic model of learning because the whole person is the centre of the learning process.

Che open-ended assessment was very enriching for both the learner and me. The learner felt validated as an individual because I listened to her experience. I came away with a more holistic idea of the learner's history. We were able to identify other needs through the assessment."

Practitioner

# Ripple

We use a ripple chart to show how our learning is connected not only to us as individuals, but also to our family, our work, our community and the larger world around us. The rings of the ripple are constantly in motion. They move back and forth, interacting and connecting with one another.

Chis approach is like our approach to literacy learning – connecting the individual learner to their community and wider world, to an economic and social context."

> – Reference Group Member

How does a social and holistic approach to numeracy make meaning and connect the individual to the larger whole?

#### We begin with the individual

Who am I? What do I need? How do I interact with others?

#### We look at who we are within our local community

Our family, work and involvement in geographic, cultural and other communities

#### We connect to the wider world

Understanding, and situating ourselves in a global economic and social context



# **Model of Holistic Numeracy Competence**

In Rethinking Assessment: Strategies for holistic adult numeracy assessment, the authors use a jigsaw puzzle to illustrate a model of holistic numeracy competence. Interlocking parts represent the cognitive and affective competencies, both of which are essential in numeracy learning. Confidence plays the central role, and is connected with all of the other puzzle pieces.

Suggested questions for assessing learners' numeracy competence related to this model are included on page 11.



#### Cognitive aspects of competence:

#### Using skills and knowledge

The key elements of this competence are repeated demonstration, understanding of concepts, and integration of different aspects of numeracy.

#### Using the Task Process Cycle

Learners demonstrate their competence through completing whole tasks following a four-phase cycle, instead of simply demonstrating isolated math skills.

#### Transfer and application of skills and knowledge

Learners are able to use what they have learned in diverse situations.

#### Affective aspects of competence:

#### Confidence

There are shifts in learners' confidence or self-esteem as numerate people.

#### **Personal connections**

Learners are able to relate their learning to their personal lives and make connections with what they do beyond the classroom.

#### Awareness of themselves as learners

Learners are aware of their learning style as well as what they have learned.

#### Growth of autonomy as a learner

Learners take control of their own learning, have opinions and take risks.

- Adapted from Rethinking Assessment: Strategies for holistic adult numeracy assessment by B. Marr, S. Helme and D. Tout, 2003



# **Task Process Cycle**

The task process cycle is one portion of the model of holistic numeracy competence. Let's have a look at it in more detail.

We suggest using a task process cycle when approaching an everyday task or problem that involves math. Thinking about these basic steps can help learners become more confident, develop better self-awareness as learners, and make personal connections with math.



#### Four steps:

#### 1. Describe task and select relevant information

Look at the task or problem and decide what information you will need to work it out.

#### 2. Choose strategy

Choose the strategy or approach that seems to fit best (e.g., that might be deciding to start with adding or grouping).

#### 3. Apply strategy

Try it out.

#### 4. Reflect on meaning of outcomes

- How did it work out?
- Do the results make sense?
- Talk about what action you might take as a result of doing this task.
- Are there other situations in your life where this kind of problem has come up before or might come up again?
- Adapted from Rethinking Assessment: Strategies for holistic adult numeracy assessment,
   B. Marr, S. Helme and D. Tout, 2003

# How can we assess learners' numeracy competence?

How you assess learner competence is also social and holistic. The categories and questions below relate to the overall model. They will help practitioners to assess learners' numeracy competence in the different areas of the model illustrated in the jigsaw on page 8.

#### Skills and knowledge

Can learners demonstrate their skills in repeated situations? Do they have understanding of skills and processes? Can they fit together different pieces of knowledge and connect new skills with past knowledge? Do they see numeracy as related competencies rather than isolated skills?

Chis project legitimized and gave a name to an approach that many people are doing already. It provided additional tools and a time to reflect."

> – Reference Group Member

#### Task Process Cycle

How do learners go about resolving a problem? What strategies do they use? Do they reflect upon the meaning of the outcomes?

#### Transfer and application of skills and knowledge

Can learners apply their numeracy skills from a specific problem to other situations?

#### Confidence

Is there a shift in learners' confidence or self-esteem?

#### Personal connections

Do learners connect their learning to other aspects of their work or personal life?

#### Awareness of oneself as a learner

Do learners recognize what they know and understand? Are they aware of their "learning style"?

#### Growth of autonomy as a learner

Are learners more independent? Are they more willing to have opinions and take risks, to get started on new tasks with less assistance than before?

#### Overall

Has there been a shift in a learner's identity as a more numerate individual?

# **Developing and facilitating activities**

As part of the numeracy project, practitioners along with their learners were invited to develop and try activities, keeping in mind the key elements of a social and holistic approach. Similarly, at the two practitioner workshops as well as at the project's summative forum, activities were designed to model and demonstrate this approach. Many of these activities are available on the project website: www.socialnumeracy.ca/activities.htm

Here are one practitioner's insights on developing and facilitating activities using a social and holistic approach. The accompanying activity appears on the next page.

I used a newspaper subscription ad to develop an activity. This is something I do often – use a text as a starting point for a math class. It might be an ad, an article in a newspaper. Once I used a story about girls/boys ice time at rinks around Toronto – we did all kinds of stuff on ratios."



# **Newspaper Activity**

Use an actual newspaper flyer, in this case a special subscription offer.

#### What do you do?

Ask learners to generate questions from the prompts (prepare by anticipating questions):

- How do you save compared to buying the paper at the newsstand?
- How much would you spend each month? Over the 10 months?
- How much is the GST?
- Where do they get 75% from?
- How much would regular delivery come to?

**Related questions:** 

- How do you actually sign up? (e.g. using website)
- How do you cancel?
- How do you make payment?

#### **Extension activities:**



Role play: sales rep explains offer and customer asks questions about offer

Flipchart and matching: provide three labelled charts for students to plot feedback:

- 1. What we know
- 2. What we do
- 3. How we feel

#### Additional thoughts:

Both of these extension activities would also work well as pre-activities to bring learners' questions and experience upfront prior to exploring the actual information and posing questions or potential math problem-solving activities.

# **Reflections on the approach in practice**

At the project's summative forum, learners, practitioners and reference group members gave their opinions on the benefits and challenges of a social and holistic approach in practice. Six practitioners, nine learners and six reference group members came together for the one-day event. The forum modelled the approach and provided participants the opportunity to share their experiences from the project, including murals.

Forum participants were asked:

# What are you doing differently now in how you 1) use math or 2) learn math or 3) teach math as a result of this project?

## Instructors are:

- approaching math from an emotional point of view at the comfort level of the learner
- seeing all kinds of lesson potential because numeracy is in every situation
- seeing that math connects to other things
- enjoying being colourful with math by using objects like beans and feathers
- using the blank page assessment
- using authentic materials from the community
- giving time to do reflections at the end of a class
- giving learners a chance to process
- getting at feelings and how people will process outside of class
- using a hands-on approach

## Learners are:

- seeing a different approach from school
- are using different ways to do math, not just numbers
- talking in front of people more
- seeing a need for math for everything in life
- using props to help with math
- attending classes and focusing

- Summary of responses, Final Evaluation Report, page 49

On the next two pages, some of the forum participants' reflections about the benefits and challenges of the approach are presented. They are organized according to the three elements of the schema of learning described on page 5 – Being, Doing, and Knowing.







# **Benefits**

#### Being (identity and relationships)

- learners become aware of how they learn
- motivating real examples are more exciting plus keeps learners motivated
- people can make connections for themselves
- helps to include many parts of our identity and experiences
- moving from challenges to success builds community and relationships
- chance to talk about how you feel about things, e.g. new things
- being together provides support (instructors, learners)
- assessment is respectful and safe
- learners make personal connections to the math by reflecting on their learning and life experiences

#### Doing (practice: strategy, application and reflection)

- makes it more realistic and easier
- allows us to work with numeracy through stories
- helps to make math make sense through things in our lives relevant!
- props, life experiences make learning more real
- instructor accommodates all levels of learners; listens and learns where they are
- learners help each other, it's social!
- helps with communication
- helps to listen to others, respect one another
- assessment involves choice
- the instructor can draw from learners' experiences

#### Knowing (content and context)

- new knowledge empowers
- traditional approach talking heads; new approach talking to each other, inclusive
- success: teacher listens, uses props, uses life experiences, relates to students as adults; students and teachers are happier
- fun to see how people do things differently by listening to others
- helps to see things more than once, and this is helpful
- relates to everyday experience
- see how people use their brain
- assessment engages everyone, not just learners
- sharing our experiences of struggles, stresses, and fulfillment helps to build community

# Challenges

## Being (identity and relationships)

- learners may not have the language skills to articulate feelings/opinions
- people learn differently sometimes they need to be shown what to do
- how do learners know they are making progress?
- does it serve the goals of the learners?
- time and resources with/for learners

# Doing (practice: strategy, application and reflection)

- relevance is not always apparent
- can be difficult if you can't show someone else because people do things differently
- many instructors don't use holistic method
  - classes too large, with different levels
  - feel they don't have enough time and resources
  - have to follow a course outline and prepare for a test
- for instructors, not just what you do, but how you do it

## Knowing (content and context)

- can be overwhelming and confusing
- textbooks can help with keeping focus
- team / group / individual work depending on learning ability
- make assessment visible to funder/government
- what's the purpose of assessment?
  - external: exam, funder
  - internal: reasons and motivations, levels, skills
- creating an environment to use assessment effectively
- learners want to know they are making progress, want to see real results on paper



The most surprising thing about the forum was meeting all the new people and having the courage to talk in front of them."
– Learner



At the numeracy project's summative forum, Tom Ciancone presents certificates to Brian, Kyle and Ashley (learners from the Selkirk Adult Learning Program) for their contributions to the project.

Che biggest surprise at the forum was that everybody had a different style of teaching and learning. It was helpful to learn from each other."

Practitioner

# A Social and Holistic Approach to Numeracy

A social and holistic approach sees numeracy as a part of life, for the whole person, within a social context. A recent pilot project used the approach in a successful field-test in three provinces.

The Labour Education Centre in partnership with the Canadian Union of Public Employees and Workplace Education Manitoba invite you to explore the social numeracy website:

- **Approach** provides more information on the approach and its components
- The Project provides background on the field-test which led to this website
- Activities provides sample activities developed by practitioners and the team leading the project
- **Reflections** provides practitioner and learner feedback on the benefits and challenges of using a social and holistic approach to numeracy
- **Resources** provides an annotated list of key print and web resources, and a list of other relevant resources



# socialnumeracy.ca

A website resource for adult literacy and numeracy practitioners