



National Research and Development Centre
for adult literacy and numeracy



Using learning styles in adult numeracy: an exploration of their value and potential in teacher training

BY JO KIRBY AND TRUDY SELLERS



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Contents

Foreword	4
1. Executive summary	6
2. The research project – aims	7
3. The Toolkit	8
4. The training programme	9
5. The research project – methodology	10
6. Findings	12
7. In-depth interviews – summary	17
Appendix 1 Training programme	21
Appendix 2 Research instruments	23
Appendix 3 Responses from in-depth interviews	26
Appendix 4 Flip chute	33

FOREWORD

BY ALISON TOMLIN, RESEARCHER, KING'S COLLEGE LONDON/NRDC

Most learners on adult numeracy courses have studied the subject in numeracy or mathematics in primary and secondary school. Many have also attended key skills and a Return to Study course, and helped their own children. They have had several different teachers and experienced various teaching/learning approaches. So why haven't any of these done the trick?

There is also an unnerving challenge for teachers. What should we do when something doesn't 'work'? When the learner has gamely completed a worksheet, say, and got the right answers, but says she or he needs more work on the particular skill, there are several possibilities. You can:

- suggest they make up some problems to try for themselves;
- ask them to explain what they have learned to another learner;
- provide another worksheet, for consolidation;
- tell them they should have more confidence in themselves, and the course will come back to the topic next term; and
- ask them to explain to you what the difficulty is, and hope that you have time to listen, to prepare different approaches and to incorporate these into lesson plans.

But there's something about numeracy that makes us all reach for reading and writing – a worksheet, a textbook, flipchart notes or a whiteboard. Despite the evidence that for some people, some of the time, texts don't work, we carry on using text-based resources (and ICT resources are often text-based at heart – worksheets on a computer screen). We have been doing this for at least 4,000 years:

the technology changes, from the Babylonians' clay tablets to computers and mobile phones, but the principle is the same. While tests and examinations continue in their present forms, we cannot avoid using text-based materials.

From worksheets to learning styles

How can we escape a world of worksheets? This report focuses on the perceptions and experiences of a group of adult numeracy teachers who took part in a training programme provided by LLU+ at London South Bank University. The programme involved the introduction of a 'Learning Styles Toolkit' produced by LLU+ and designed to support visual, kinaesthetic and tactile approaches to developing numeracy.

The programme did not propose a learning styles approach as a new alchemy, solving all the problems confronting numeracy learners and teachers. In any case, a review of learning style models (Coffield 2004(a) and (b)) suggests there is not much reliable evidence that it is helpful to measure individuals in an attempt to match them up with a learning style (e.g. 'she's got a kinaesthetic learning style'). On the other hand, there is every reason to support individuals and groups in developing 'metacognitive awareness', i.e. an interest in how they learn best, in the different approaches available, and in how those relate both to learners' own ways and experience of learning and to the skills or knowledge they are developing (Moseley et al. 2003). There is also a substantial body of research showing the value of discussion in numeracy classrooms (reviewed in Coben et al. 2003).

“There's something about numeracy that makes us all reach for reading and writing – a worksheet, a textbook, flipchart notes or a whiteboard.”

Using the Learning Styles Toolkit led the teachers, and hence their learners, into different ways of learning and teaching mathematical concepts. Indeed, it may be that working on numeracy with visual, tactile and kinaesthetic learning styles in mind not only makes more and different approaches available, as discussed in this report, but also changes our take on worksheets and textbooks. We (learners and teachers alike) want to know that the materials we use – software, jigsaws, worksheets, games, constructions – will ‘work’. The report suggests that learning styles approaches can ‘do the trick’, not in a magical delivery of learning, but in opening up new ways for learners to develop, connect and use numeracy concepts.

The National Research and Development Centre for Adult Literacy and Numeracy (NRDC) brings researchers and practitioners together. The project reported here is the work of practitioners – teachers and teacher educators working together to develop practice and expand what we are able to offer to learners. The teachers who contributed to the project found the process of trying alternatives liberating. Reflecting critically on their own practice, engaging in new approaches, maintaining scepticism, and suggesting improvements to the resources: the voices of practitioners are central to this report.

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Peer Review

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1. EXECUTIVE SUMMARY

This report focuses on the perceptions and experiences of a group of adult numeracy teachers (the 'participants') who took part in a training programme (the 'programme') provided by LLU+ at London South Bank University.

The programme was delivered by Noyona Chanda and Ross Cooper. It demonstrated learning styles approaches in the teaching of numeracy and included the introduction of a 'Learning Styles Toolkit' (the 'Toolkit') produced by LLU+. The *LLU+ Learning Styles Toolkit for Teaching and Learning* is a set of professionally-produced resources and guidance material designed to exemplify visual, tactile and kinaesthetic activity-based approaches to the teaching and learning of adult literacy, numeracy and English for Speakers of Other Languages (ESOL). The Toolkit was influenced by the learning styles model developed by Dunn and Dunn¹, but this report does not advocate any one approach.

The aim of the research project (the 'project') was to investigate participants' perceptions and understanding of learning styles and to assess how far these changed in the course of the programme. The underlying interest is in researching improvements in the practice of numeracy teaching.

Main findings

During the programme, participants started to think about, and to use, radically different ways of teaching numeracy. They became aware of the importance of matching strategies to their objectives, and the effect of this in engaging learners.

Participants' perceptions of the training programme

- Participants felt that the effectiveness of the training rested on a combination of:
 - hands-on training which demonstrated activities and was phased over time;
 - using the Toolkit as a trigger for further ideas; and
 - a 'deal' or 'contract' between trainers and participants which involved commitment.
- Participants found the collaborative methods used in the programme to be a rewarding and effective approach to training and development. 'Learning conversations' and problem-solving were stimulating

and productive for newcomers seeking qualification, and for experienced professionals wishing to refresh their skills. This element had largely been missing for these participants in previous training, and in programmes to gain qualifications.

- The programme gave participants a vision of how learning styles approaches could make teaching and learning more effective.
- Participants compared the training favourably to other continuing professional development (CPD) training that they had undertaken. Specifically, they mentioned that it was relevant, practical and could be directly applied in the classroom. Some felt strongly that these approaches should be included in courses leading to initial teaching qualifications and/or level 4 specialist qualifications.

Participants' perceptions of the Toolkit

- Participants regarded the Toolkit as an essential ingredient of the training. It exemplified the approaches modelled in the training and gave them some useful tools to take back to their centre.
- They all felt that, without the training, they would not have been able fully to exploit the Toolkit's contents. It was the combination of the Toolkit and the training, with the requirement to try it out, that provided the winning formula.
- Most participants reported that they had made limited use of the contents of the Toolkit in the classroom. However, stimulated by the training, they used it as a source of ideas and inspiration for teaching and learning activities.
- They found that the Toolkit was an excellent way of explaining the messages of the training to colleagues in their centres.

Participants' perceptions of the applicability of the training programme and the Toolkit to their classroom practice

- They perceived that the main strengths of the training and the Toolkit were their direct applicability to classroom practice.
- They believed that the training and the use of the Toolkit approaches had a profound effect on them, and that this would benefit their learners.
- They acknowledged that, in adopting these strategies, they needed to spend more time preparing their

lessons. However, they said that they felt motivated to do so because of the benefits they perceived in using these approaches.

- They found that even simple resources could sometimes be difficult to get hold of. Strong management support is a critical factor.
- They became convinced of the power of activity-based learning for their learners, because they had engaged in

practical activity-based learning themselves.

- They emphasised the important role of reassurance in good practice. Participants needed permission to teach in these ways, and they looked for authority to use creative strategies. Participating in the programme helped them to gain the confidence to do this.

2. THE RESEARCH PROJECT – AIMS

The project focused on a training programme about learning styles in numeracy teaching, provided by LLU+ at London South Bank University. The training was delivered in three one-day sessions spread over four months in 2004 and introduced participants to a learning styles Toolkit.

The aim of the project was to investigate and record participants' perceptions of:

1. the training programme;
2. the Toolkit;
3. the applicability of the training programme and the Toolkit to their classroom practice; and to:
4. explore how participants' perceptions and understandings changed and developed over time as a result of their involvement in the training and their access to and use of the Toolkit.

The two researchers attended all three days of the training as observers, interviewed each participant on a one-to-one basis, and facilitated a group discussion at the end of the third day.

Participants were asked to reflect on aspects of their practice and to describe how the programme and the use of the Toolkit had contributed to their development as numeracy teachers.

3. THE TOOLKIT

The *LLU+ Learning Styles Toolkit for Teaching and Learning* is a set of professionally-produced resources and guidance material designed to exemplify visual, tactile and kinaesthetic activity-based approaches to the teaching and learning of adult literacy, numeracy and ESOL.

Each resource is accompanied by instructions. The Toolkit, which is presented in a plastic case, includes a photocopyable handbook, which explains how to make resources, together with a range of templates. It was commissioned by the Department for Education and Skills (DfES) in 2002 as a prototype that could be used in staff development to explore a learning styles approach and to exemplify resources and strategies.

The Toolkit is intended to be a resource to inspire teachers and learners to develop and adapt the materials for their own circumstances and to produce further materials. Each resource is designed as a model involving a particular game, purpose, structure, strategy, and material. The key purpose of the Toolkit is for users to experience the resources and to consider how they could be adapted for a wide range of contexts and content, as part of a learning styles approach to curriculum design and delivery. The Toolkit is thus intended as a learning styles 'starter pack' that practitioners can develop using their own creativity (and that of their learners).

3 (i) Contents of the Toolkit

The contents are in four sections, each identifiable by a colour code.

Section 1. Learning styles	Section 2. Numeracy activities	Section 3. Literacy activities	Section 4. ESOL activities
<ul style="list-style-type: none"> • Flip chute activity (see appendix 4) • Myself as a learner • Learning wheel activity • Brain chart activity 	<ul style="list-style-type: none"> • Equivalent measuring wheel • Tables, charts and graphs jigsaw • Jigsaw strips • Times table key-ring • Sequence steps for averages 	<ul style="list-style-type: none"> • Speech punctuation • Hands • Parts of speech • Reading and matching numbers • Creative writing wheel • Spelling strategies 	<ul style="list-style-type: none"> • Story cards • Clothes bingo • Asking questions game • Tenses chart • Pic-a-hole

The types of resources modelled include:

- Matching pairs
- Jigsaw
- Jigsaw strips
- Learning wheel
- Feet
- Hands
- Board game
- Bingo
- Card games.

They include the use of card, Velcro, magnetic card, counters, clothes pegs and key rings. Visual information and colour coding is a key feature of the materials, so that they appeal to learners who appreciate visual information in addition to tactile and kinaesthetic movement. The materials are designed to be self-correcting, to encourage exploration and problem-solving. This enables the teacher to work more as a facilitator and to see for themselves what individual learners do and don't understand as they use the resources.

4. THE TRAINING PROGRAMME

4 (i) Aims

The formal aim of the programme was:

'To train numeracy teachers to understand, develop, implement and evaluate a learning styles approach to teaching discrete numeracy classes to adults.'

The programme was delivered by two trainers in three one-day sessions held between July and November 2004. The breaks between sessions were designed to maximise the impact of the training, allowing time for participants to implement and reflect on the ideas, and to share any problems with colleagues over the training period.

The trainers preferred to use the term 'learning styles approaches' (plural) to imply the taking into account of a general knowledge and awareness of learning styles and models in the organisation, monitoring, assessment and delivery of teaching and learning. They distinguish this from 'a learning style approach' (singular) which they define as 'an attempt to match to a specific learning style, leading to specific strategies, or the use of a specific learning styles model.'

The trainers' key messages about learning style approaches were:

- Differences in preferred learning styles can have a profound effect on the experience of learning and teaching.

- The organisation of activities and materials must be informed by both the key learning objectives and the preferred learning styles of the learners.
- Learners' preferred learning styles can be identified and developed through the teaching and learning process, particularly by developing a diagnostic approach that takes notice of and responds to their difficulties.
- Learning styles approaches are not a fun reward for effective learning and/or hard work; rather, they facilitate effective learning which is also fun.
- Enabling change that impacts positively on learning requires structural support in the workplace, including peer support and coaching.

The key messages about the Toolkit were:

- The materials are exemplars to be adapted to suit participants' purposes.
- Using the exemplars can demonstrate and inspire effective teaching/learning activities.
- The materials are most effective when learners create them for themselves.

Comparing these points with the participants' responses at the end of the programme helped the researchers to assess the match between the trainers' intentions and the participants' understanding of these.

4 (ii) Outline of the training programme

(For a detailed account of the programme, see appendix 1)

	Day 1	Day 2	Day 3
Morning	Learning styles <ul style="list-style-type: none"> • An experiential approach to what we mean by learning styles. • What aspects may be important to any individual? • What aspects are important for every individual? 	Stages in learning numeracy <ul style="list-style-type: none"> • Exploring eight key stages (or elements) in teaching and learning numeracy. 	Peer evaluation and guidance <ul style="list-style-type: none"> • Evaluating progress in implementing learning styles approaches. • Identifying appropriate strategies to develop professional skills in learning styles and numeracy.
Afternoon	Numeracy and learning styles <ul style="list-style-type: none"> • Introduction to the Toolkit. • Developing a learning styles approach in the context of adult numeracy. 	Learning and teaching styles for the different stages <ul style="list-style-type: none"> • Linking stages, learning styles approaches and effective teaching strategies. 	Making materials: review <ul style="list-style-type: none"> • An opportunity to develop and extend tactile and kinaesthetic numeracy materials for use with your learners. • Review of the programme.

4 (iii) Use of the Toolkit in the training programme

The Toolkit was introduced in the afternoon of Day 1 of the programme. Participants were invited to explore the contents of the Toolkit and to discuss how they might use items in it. The aim was not just to make delivery more motivating, but to make learning, practice and assessment more effective, with a stress on the importance of having clear learning objectives. The participants each took a Toolkit away with them at the end of Day 1.

It was emphasised that the contents of the Toolkit were intended to illustrate activities and approaches – at least half of the contents were literacy or ESOL examples – and that participants should consider how they could be adapted to numeracy objectives. The trainers also stressed that, while the items in the Toolkit were ‘polished’, they were easy for participants to make themselves. Participants were told that, in fact, locally-made versions might be preferable for everyday use and they were given a booklet of instructions on how to do this.

The Toolkit was not used directly in Days 2 or 3. Participants were invited to feed back on how they had used the Toolkit in their teaching, but, more significantly, on the approaches that they had used that were inspired by the Toolkit.

Day 2 of the training introduced other resources, including commercially produced materials that could be used to support learning styles approaches.

On Day 3 there was a materials-making session that encouraged participants to construct their own activities and introduced them to other resources and templates available online. All participants were engaged and worked actively together to achieve results.

5. THE RESEARCH PROJECT – METHODOLOGY

(For the aims of the project, see section 2, pg 7)

5 (i) Methods

The aim of the research was to collect participants’ views on the impact and value of the training experience and the Toolkit, so the methods were qualitative and focused on participants’ perceptions. The approach used was narrative inquiry, where participants were encouraged to tell their story in their own words. Some quantitative data was also collected.

The sample (13 participants) was small. However, the research was very detailed, using in-depth interviews that produced interesting and compelling evidence.

The research did not attempt to do controlled systematic trialling. There was no control group to assess the impact of the training and the Toolkit. This limitation is perhaps worth addressing in later research.

5 (ii) Planning

The project started in April 2004. The project detail and methodology were drawn up by a steering group made up of representatives from NRDC and the Learning and Skills Development Agency, and one of the programme trainers from LLU+. The two practitioner-researchers were included in the planning from the start. It was intended that they should be largely responsible for drawing up the report, and that their expertise would enable them to contribute to the analysis and interpretation of the data from a practitioner’s perspective.

The steering group met at regular intervals to discuss the training programme and the progress and methodology of the research project.

Ethical guidelines were adhered to, with participants’ consent being obtained for taping interviews for inclusion in the report, and for photographs to be taken during the training.

Project timeline				
April 2004	July	October	November	December 2004
Planning. Recruiting.	Training Day 1. Participant profiles.	Training Day 2. Interviews.	Training Day 3. Group discussion.	Report compiled.

5 (iii) The research instruments

The following methods of data-collection were used:

Day 1

- A questionnaire about participants' personal profile, qualifications, experience and teaching context, and their perceptions at the start of the programme.
- Post-its produced during the training.
- Participants' written evaluations of the day.
- Trainers' written evaluations of the day.

Between Days 1 and 2

- Participants' logs/diaries.

Day 2

- Post-its produced during the training.
- Participants' written evaluations of the day.
- Trainers' written evaluations of the day.

Between Days 2 and 3

- In-depth individual interviews.

Each participant was interviewed at their place of work, but away from the classroom. The interviews lasted approximately 1½ hours and consisted of a series of prompts based on the research questions. The interviews took the form of narrative inquiry and gave the opportunity to explore participants' perceptions in depth and for them to 'tell their story'.

Day 3

- Post-its produced during the training.
- Participants' written evaluations of the day.
- Trainers' written evaluations of the day.
- Whole-group discussion, in the absence of the trainers.

The researchers attended all three training days in order to record the training activities and to absorb the spirit and atmosphere of the programme.

5 (iv) The participants

The intention had been to recruit about 16 numeracy teachers to the programme. LLU+ sent out invitations through their network. Respondents were selected to include a range of organisations and on a first-come, first-served basis.

In the event, of the 16 selected, 13 attended Day 1, 11 attended Day 2, and ten attended Day 3. The participant group consisted of the 13 numeracy teachers who attended Day 1. The teachers who did not attend on Day 1 were contacted and reasons for their withdrawal or absence were sought. Two had illnesses which prevented them from starting the programme, and one had taken a managerial post which involved less teaching. Two of the participants who did not attend Day 3 were contacted; one had been ill, and the other said that the pressure of work had prevented him attending. They were both disappointed to miss the final day and stated that they would catch up with colleagues on the programme on what had transpired on that day. They were in no doubt that the programme had a positive impact on them, and that the messages would continue to influence their work with learners.

The pre-project questionnaire showed that, although there was a relatively small number of participants, they came from a wide range of different contexts in the sector. There was considerable strength in this mix, as was evidenced by the fruitful exchanges during the course of the programme.

6. FINDINGS

This section provides an overview of the data collected during the project. It is a key section as it captures not just the perceptions of the participants, but, hopefully, some of the energy and enthusiasm that the training and the use of the Toolkit engendered.

The data are reported in the chronological order in which they were collected and highlight prior perceptions, current perceptions and any development and changes in perceptions.

6 (i) Findings from the pre-project questionnaire

The purpose of the questionnaire was to:

- gain an overview of the personal/professional characteristics of the participants (to ascertain potential particularities of the group); and
- probe their initial perceptions of the purpose and possible impact of participation in the programme, to give some benchmarking data against which to compare perceptions at later stages.

To see the original questionnaire, go to appendix 2.

Demographics

Gender

Male	6
Female	7

Although *Skills for Life* staff tend, in the main, to be female, the gender balance within staff teaching numeracy is likely to be more even.

Ethnicity

White	9
Mixed	1
Black or Black British	2
Chinese	0
Asian or Asian British	1

Given the size of the sample there was a reasonable range of participants from different ethnic groups.

Age

20 – 29	2
30 – 39	2
40 – 49	4
50 – 59	3
60+	1
Not specified	1

There was a good spread across the age categories. The majority of participants are aged between 40 – 59. This is not untypical of practitioners in the sector.

Place of work (type of establishment)

Further Education (FE) college	8
Adult and Community	2
Training provider	1
Prison	2

Although the majority of participants work in FE, there are participants from each provider sector except sixth-form colleges.

Teaching experience

- More than half of the participants were relatively inexperienced, having worked for their organisation for less than three years. Two participants were in their first teaching post. The remainder were experienced teachers with at least five years in teaching.
- 11 participants described themselves as classroom teachers; two described their role as co-ordinator/manager.
- Ten participants worked full-time and three part-time. The percentage working full-time may be unrepresentative of the sector as a whole. However, part-time staff may not always have the opportunity to participate in a medium-term programme such as this one.
- Nine participants taught numeracy for 11 or more hours per week. Four taught for less than four hours per week. One was a learning adviser who taught some numeracy; one was a manager/coordinator with a small teaching load; one worked part-time.
- This diversity of teaching background, environment and experience gives a good range from across the sector as a whole.
- 12 participants were working towards a qualification relevant to the teaching of numeracy (including three who were working towards the level 4 specialist qualification).
- All the participants were working with discrete adult numeracy groups. The trainers made no attempt to steer the selection of learners with whom the participants would try out approaches from the programme. At the final interview, it emerged that three participants were applying the training and using the Toolkit with ESOL-only groups. Some had a number of ESOL learners in their groups. Others had no ESOL learners. This was not a factor that we had intended to research. However, this gave rise to interesting perceptions of the value of using this approach to teach, reinforce, or assess grasp of numeracy concepts with learners who are learning a new language alongside their numeracy skills.

Experience and initial perceptions of learning styles

Nine of the 13 participants had attended some previous training on learning styles (including two who had attended training delivered by the same trainers as were on this programme).

Participants were asked to list up to three points in response to each of the following questions:

1. What was your motivation for volunteering for this programme?

Eight participants were motivated by the perception that taking part in the programme would make teaching and learning more effective. Of these, five were motivated by an interest in learning styles. Two wanted to learn more about effective differentiation strategies, two wanted continuing professional development, and one was concerned to raise learners' achievement.

All the participants had volunteered to participate in the programme: there was an underlying assumption that it would at least be of interest, if not of value, to their teaching.

As they had been released to attend, it was clear that most participants had good initial support from management. However, only one centre appeared to have a clear strategic approach to participation in the programme, with a structure of meetings and networks to share practice.

2. Do you use a learning styles approach in your numeracy teaching at present?

The responses to this question may have been influenced by the fact that, because of pressure to proceed with the training, participants completed the questionnaire at lunchtime, after a morning awareness-raising session on learning styles approaches. They had therefore heard a great deal about the topic.

All 13 participants stated that they already used a learning styles approach in their numeracy teaching.

Examples of using a learning styles approach were:

Vary approach	3
Tactile materials	3
Kinaesthetic activities	2
Visual aids	2
Games/competitions	3
Oral activities	2
Sequential/holistic approaches	2
Apply concepts to real life situations	2
Identify and work to learners' preferred learning styles	2
Use ICT	1
Group work	1

It later became clear that this early conceptualisation changed and was enriched during the programme.

3. What do you expect the training will cover?

Ten participants expected to find out how to use the Toolkit, along with practical tips about its use. Six anticipated that they would get a definition of learning styles, including some idea of their variety.

One participant expected to find out more about how to assess learners' learning difficulties, one about how to assess learning styles, one about what resources to use, and two about the theory behind learning styles.

4. How do you think the training in learning styles approaches will benefit your learners?

Four expected the training would benefit their learners because their own approach would become more varied. Three thought it would raise motivation and achievement among their learners, and three that it would help learners to understand concepts. Two expected the training would raise the self-esteem and confidence of learners, and two hoped for 'general benefit'. One hoped that the training might benefit learners with learning difficulties, or with dyslexia. One thought it would help with producing individual learning plans, one that it would help learners be more reflective, and one that it would encourage learners to know that everyone is different.

6 (ii) Comments from the Post-its on Day 1

This exercise invited participants to list:

- i) the potential benefits of the Toolkit for learners.
Post-it comments included:
reflecting, negotiating, unblocking, enjoying, stimulating thinking, changes dynamics.
- ii) ideas for the use of the Toolkit.
Post-it comments included:
use in oral/ mental maths, practical, teamwork, outings, computers, interactive whiteboard, breaks in the lesson, music, brain gym.

6 (iii) Comments from participants' evaluations of Day 1

(To see the evaluation form, go to appendix 2)

Intend to use and adapt items / show resources to colleagues / good to have practical demonstrations / replace classroom rote learning with the flip chute / use learners more to prepare things / plan lessons with this in mind / be more closely aware of how each learns / reflect on improving my delivery style.

These comments show that participants were starting to consider how they might apply what they had learned in the training to their practice.

6 (iv) Comments from trainers' evaluations of Day 1

Participant response to the learning styles experiential activities was extremely positive. Participants engaged well with the review of the Toolkit. There was some trepidation about the sheer weight of the Toolkit. There was only one negative comment: that the trainers could respond more effectively to questions.

6 (v) Comments from participants' log-diaries kept between Days 1 and 2

Eye-openers / got the class making things / design of some Toolkit items led to difficult problems being left till last and then easy-to-guess answers / tried a paired game and decided to include using a stopwatch.

It was already apparent that participants were developing their own examples, adapting the items and adding their own ideas.

6 (vi) Comments from Post-its on Day 2

This exercise asked the participants to record on Post-its the approaches they had tried with their learners, what had gone well, and any problems experienced. The group were then asked to discuss possible solutions to overcome the identified problems. Feedback from this Post-it exercise included:

Approach tried	What went well	Problems	Possible solutions
Flip chute – making cards and with ready-made cards.	Fun – good to do in pairs. Self-checking – gave feeling of success. People went off and made their own (someone made an amazing chute!).	I didn't have the stuff to make one when people wanted to. Takes time. Someone didn't like it (some people find it hard to make things).	Have the stuff available. All optional.
Comparing fractions, decimals, percentages – big sheet, whole class stuck strips on paper.	More interesting than worksheets. Everyone involved – didn't think it was childish.	(In the classroom..) Ringleaders took over.	Allocate strips. Arrange smaller groups.
Writing numbers on A4 paper – learners line up in order.	It was fun when they arranged the numbers in ascending and descending order in different groups and as a whole class.	Classroom size – tables had to be moved as the class was too large.	Divide the large group into smaller groups and get the rest of the class to decide the answers.
Label 2D shapes and position shapes on a 'tree' diagram – extend 'tree' diagram so that one shape on the end of each 'branch'.	Learners talk about properties of shape. Use own categories to distinguish between shapes. Recall of names was good and learners could refer to previous work.	Learners (ESOL) did not know what 'less than' meant. Not enough glue sticks.	Need to anticipate vocabulary. Careful acquisition over time.

- Introducing much more activity in numeracy sessions was seen as very effective. There was a strong sense that learners' understanding improved.
- There was more discussion, fun and interaction than before.
- The involvement of the learners in preparing materials was seen as directly affecting motivation and success.
- These approaches helped participants to spot where learners were not understanding, and to have new strategies for filling gaps in knowledge and skills.

The fact that participants were occasionally critical of some of the exemplars in the Toolkit was to be expected. Indeed, the trainers anticipated this desire for ownership of the strategies. There were criticisms about the materials being

'not quite right for my learners', or seeming 'to be for children'. These are not untypical responses to materials from *Skills for Life* practitioners, who are always vigilant about getting it just right.

Since the participants were collaborating with others, they readily arrived at solutions to the problems. Participants realised they would need certain materials to hand, that classrooms might be more noisy (lively), and that changes would be required. This actively encouraged participants to develop a reflective approach and not to be discouraged by any apparent initial failure. They were willing to recognise when a chosen activity was not suitable for purpose.

6 (vii) Comments from participants' evaluations of Day 2

(To see the evaluation form, go to appendix 2)

- *The global overview idea – an excellent method for learner awareness of topic and a record of learning.*
- *Good discussions of what techniques have actually worked in practice for everyone (not just what would work in theory!)*
- *Ideas for implementation – practical suggestions are so helpful.*
- *Better knowledge of lesson planning – how to cater for different learners.*
- *Try getting learners to make some of the materials.*
- *I will definitely try to devise methods other than writing on the board.*
- *I will use the plan to think carefully about benefits of activities.*
- *I plan to use the activities to reinforce the teaching of concepts.*
- *Was feeling exhausted but so glad I came – I have enjoyed trying out the materials at work.*

Most participants said that the training had given them a wealth of practical ideas that they felt they could implement and apply directly to their teaching.

6 (viii) Comments from Post-its on Day 3

Participants were asked to comment on how the use of items in the Toolkit had affected their learners.

- *Brought misconceptions to light.*
- *A learning check for learners and for me.*
- *Encourages learners to 'talk' maths.*
- *All learners were involved; they end up teaching each other.*
- *They developed new knowledge.*
- *Very good for assessing learning.*
- *Produce a quality template and then adapt to suit.*

6 (ix) Comments from the group discussion

(To see the prompts for the discussion, go to appendix 2)

- *'The training is so practical ...very hands-on.'*
- *'It was about taking account of learners' different preferred ways of learning and delivering a variety of styles during a session.'*
- *'We've been inspired and given ideas' – 'the Toolkit is a solid, polished thing to show colleagues and essential for disseminating to own organisation.'*

- *'The range of the delegates – in all respects was excellent and contributed loads.'*
- *'We've learnt a lot talking about the items we've tried and how we used them' – 'different ideas on how to use the same gear – and to adapt it.'*
- *'This learning styles approach, this training style with a Toolkit to ensure active engagement, should be included in all teacher training courses.'*

Perceptions had shifted from 'nice to know about' at the start of the programme to 'a huge change' by the end. Participants felt that they had totally revised their approaches. The development was seen as fundamentally important and not just another option. The collaborative model of training, which relied on peer support/coaching for the participants, was essential to the success of the take-up of ideas and was then echoed in participants' dealings with learners.

The most striking outcome, perhaps, is that all seemed to be attracted or won over to a lesser or greater degree.

The comments changed from expected, pragmatic responses, e.g. *'expect it to help with assessment, with Individual Learning Plans (ILPs)'* to more profound reflective responses (e.g. *'You can't go back – what was I doing before?!'*). Participants were convinced that to 'get it' you had to 'do it' – seeing was believing.

Significant shifts in perceptions included:

At the start of the programme	By the end of the programme
No one expected that needing the confidence to work like this was an issue.	It became a prime consideration, and a key outcome of the programme.
No one had linked assessment, clarifying objectives, and lesson and programme planning to learning styles approaches.	They saw this as a substantial benefit arising from the new approach.
No one mentioned the key role played by collaborative learning in problem-solving.	They were enthusiastic supporters of this concept.
Most expected that the programme would focus on finding out about learning styles in a standard (passive) way.	They had come to realise that 'assessing' learning styles was almost a tangential issue.

7. THE IN-DEPTH INTERVIEWS – SUMMARY

(To see the interview schedules, go to appendix 2)

The interview prompts covered:

- prior perception of learning styles;
- prior use of a learning styles approach;
- impact of the training programme;
- use of the Toolkit;
- practitioner development.

After collation and analysis of the transcripts of the interviews, it was clear that certain themes were emerging that would best be reported under the following headings.

- i) Prior understanding of learning styles.
- ii) Impact of the training programme.
- iii) Impact of the Toolkit.
- iv) Confidence.
- v) Impact on practice.
- vi) Impact on planning.
- vii) Benefit to learners and knowing learners better.
- viii) Knowing that learning takes place.
- ix) Benefits of using the activities from the training and Toolkit with ESOL learners.
- x) Reflecting.
- xi) Comparison with other CPD Programmes.

A detailed report on each theme is included in appendix 3, supported by extensive verbatim quotations from the interviews.

The headings in this summary are matched to the original aims of the project (see paragraph 2, pg 7):

1. The participants' perceptions of the training programme;
2. The participants' perceptions of the Toolkit;
3. The participants' perceptions of the applicability of the training programme and the Toolkit to their classroom practice;
4. Changes and developments in participants' perceptions and understandings as a result of the training and use of the Toolkit.

7 (i) The participants' perceptions of the training programme

Overall, participants were very enthusiastic about the training programme.

'We've been inspired and given ideas.'

A few comments showed reservations, *'Day 1 was rather hurried, I lost momentum over the summer holiday'*, but these were rare.

Participants stated that they particularly valued:

- the enthusiastic and well-informed training;
- the modelling of theory through practical activities and the firm link between theory and practice;
- the practical ideas that could be directly applied to their numeracy teaching;
- the staged unfolding of the training – allowing opportunities to build on previous learning, to try out strategies in the classroom, and for reflection;
- the collaborative groupwork and sharing of ideas;
- the framework of the programme that gave a compelling context.

Taken in combination, these points have the potential to become a powerful model.

Participants reported that they had been given the confidence to try out different approaches, but within a framework that helped them to consider the value of activities to the teaching objectives and to the learners. It helped them to re-frame the way they worked and re-energised their practice, by making them think more carefully about how they planned and delivered their teaching, and about the purpose of the teaching and learning activities they were using. They were becoming reflective practitioners.

Over the course of the training programme, the participants moved away from a vague understanding of learning styles as a way of categorising and labelling learners and towards 'taking into account a general knowledge and awareness of learning styles and models in the organisation, monitoring, assessment and delivery of teaching and learning'.

Any resistance to accepting the value of a learning styles approach was very slight and from a small number of participants. Even this disappeared as they worked together on the approaches, and jointly dispelled any anxiety. They were setting out on a problem-solving mission which mirrored the way that it was intended they should now proceed to operate with their learners. Some already believed this was the way to work; the programme reinforced this for them.

Overwhelmingly, participants reported having fun and being confirmed in the belief that numeracy teaching and learning can be enjoyable. They perceived that, by using the learning styles approaches from the training, they were imparting this belief to their learners.

7 (ii) The participants' perceptions of the Toolkit

The participants perceived the Toolkit to be a useful adjunct to the training. It exemplified the approaches modelled in the training and gave them some useful tools to take back to their organisation. However, they all felt that the training was more valuable to their development than the Toolkit: without the training they would not have been able to exploit the contents of the Toolkit.

'I think the Toolkit won't work without the training – no, the training's more important. The Toolkit's really good, but you can make those things yourself once you've got the ideas.'

They saw the principal value of the Toolkit as:

a) A source of ideas and inspiration for activities.

Most participants reported that they made limited use of the contents of the Toolkit in their classrooms. This was because of the limited range of numeracy activities in the Toolkit and the difficulty in unpacking and repacking the plastic case. They did, however, make their own versions of activities and, importantly, through the course of the programme, started to encourage their learners to construct materials based on the exemplars.

They felt that considerable time was needed to examine all the Toolkit items and reflect on how they might be used (particularly how some items might be adapted to a numeracy context). One participant worked with a colleague to go through the entire Toolkit and categorise possible uses.

The intention is that the Toolkit should be a 'starter pack' and could be customised to suit local needs. However, the participants' perception was that the training – giving them insight into the potential of the activities and the value of these approaches – was an essential precursor to any customisation.

b) A useful stimulus for disseminating the learning styles approaches to colleagues.

The attractive and professionally-made Toolkit and its contents captured the attention of colleagues and provided concrete tools for demonstrating the approaches and activities. Several participants said that the Toolkit came in particularly useful when reporting back to, and attempting to enthuse, managers.

The participants had some reservations about the Toolkit – particularly its weight and the difficulty in repacking it. Some felt that there was too much in it, while others felt that there were insufficient materials directly aimed at the teaching and learning of numeracy. Several participants felt that there should be one toolkit for numeracy and another for literacy/ESOL. It may be that further piloting of the Toolkit by practitioners from all three disciplines could inform development and refinement of the contents and design of the Toolkit. However, from the experience of this programme, the training would be an essential part of such a process.

7 (iii) The participants' perceptions of the applicability of the training programme and the Toolkit to their classroom practice

Participants believed that the training and the use of the Toolkit had a profound effect on them, and that this would impact on their learners. They perceived that the main strengths of the training and the Toolkit were their direct applicability to classroom practice:

What it did was energise me to think about what I was doing in the classroom and what I could be doing.

Some training that you go to you can't make a connection to your teaching. I could see a direct application for this.

I like the practical training – because, after all, that's what you do in the classroom.

Participants found that they were convinced of the power of working in this way, because they had engaged in practical, activity-based experiences themselves.

All the participants used approaches and activities from the training and/or the Toolkit in their teaching. The areas that participants identified as sticking points, and where they wanted to use their new-found awareness, were:

- place value;
- tables;
- the four operations;
- decimals;
- fractions;
- percentages;
- number sequence;
- two and three dimensions.

They felt that there were real benefits in these approaches, both for themselves and for their learners. Some of the benefits they cited were:

- increased learner motivation;
- more interaction and numeracy-orientated discussion;
- improved formative assessment; they were better able to observe where learning was taking place or diagnose difficulties.

Five participants used the learning styles approaches solely or partly with ESOL learners. They felt that an advantage of these approaches was that the learners could often demonstrate numeracy skills without being constrained by lack of the appropriate English vocabulary. In addition, they reported that their learners' vocabulary had improved.

Participants reported that the activities were not always successful. However, the reflective and problem-solving approaches that were encouraged through the training helped them to think about planning alternative strategies, rather than abandon them altogether.

For example:

Problem When used as a starting activity – some pairs worked faster than others and some were unable to complete the activity.

Solution Use at the end as a re-cap of lesson and as a learning check.

Problem Ringleaders took over.

Solution Allocate resources. Arrange smaller groups.

Problem Learners did not know what 'less than' meant.

Solution Anticipate vocabulary needs.

Participants acknowledged that, in adopting these

strategies, they needed to spend more time preparing their lessons. However, they said that they felt motivated to do so because of the benefits these approaches would bring. Several participants said that they were building up a bank of resources that they could use in future.

Resources could sometimes be an issue – simple items like scissors and glue-sticks could be difficult to get hold of, especially in prisons. This is where strong management support could become a critical factor: one organisation had set up a numeracy base room that teachers could use to prepare and store materials; another participant had line-manager backing to secure funding for more display boards; others had permission to move classroom furniture to facilitate group work.

7 (iv) Changes and developments in participants' perceptions and understandings as a result of the training and use of the Toolkit

All participants claimed to have already had some awareness of learning styles approaches, and many said that they already used these. However, they also said they did not have a grasp of the theory behind it, and had received little or no support in applying the concepts in the classroom. This programme gave them a vision of how learning styles approaches could make teaching and learning more effective. Previously they had seen learning styles as a constraint rather than a liberator.

Participants compared the training favourably to other CPD that they had undertaken. They said that this training was relevant, practical and could be directly applied in the classroom. Some felt that these approaches should be included in initial teaching qualifications and/or level 4 specialist qualifications.

They emphasised the role of reassurance in good practice. They needed permission to teach in these ways, and they looked for authority to use strategies that were creative. Participating in the programme gave them more confidence to do this.

They found the collaborative approaches used in the programme a rewarding and effective way of training and development. Sharing and problem-solving were stimulating and productive for newcomers seeking qualification, and for experienced professionals wishing to refresh their skills. They said that this element had

largely been missing in their former training and in programmes to gain professional qualifications.

Most participants had disseminated the learning styles approaches to their colleagues, or intended to. One participant, who has a management role, said she would disseminate the approaches to literacy and ESOL teachers in her organisation and would include such strategies in their framework for observation of teaching and learning.

It is not possible to judge whether the impact on practice will be sustained, or whether the involvement demonstrated during the programme will have a wider effect on the participants and their organisations.

Reasons for this include the following.

- The research project was relatively short term and there are no plans at present for a follow-up study.
- The project was not specifically linked to the *Skills for Life* CPD framework.
- Participants could be given a certificate of participation from LLU+, London South Bank University, but it is not clear how this could be recognised within the *Skills for Life* CPD framework.

However, there is no doubt that the project generated enthusiasm. As one participant said:

I've enjoyed working with these approaches and, as you can tell, I'm very enthusiastic. I just want to do more!

APPENDIX 1

THE TRAINING PROGRAMME

Learning styles and numeracy

It is important to note elements of the environment of the training – not least the enthusiasm, knowledge and commitment of the trainers – as these, as least as much as the content, clearly made an impact on the participants.

- The tables in the room were set out with tactile and kinaesthetic materials that participants were

encouraged to handle before the session started. This created an air of engagement and anticipation.

- Emphasis was put on the importance of health and environment to successful learning – refreshments included plenty of fruit and water. Water was provided throughout the day and there were frequent breaks, 'step changes', and opportunities to move around during the training.

Day 1**Key objectives:**

- To understand the importance of learning styles approaches to learning and teaching numeracy.
- To understand the range of differences that reflect learning styles and how to prioritise teaching strategies.
- To use the Learning Styles Toolkit to inspire the development and use of tactile and kinaesthetic learning materials.

a.m. session

A broad introduction to learning styles and a variety of models.

- The theory session incorporated a

number of visual and kinaesthetic activities.

- Participants were invited to consider – individually and in groups – how the use of different approaches could make teaching and learning of numeracy more effective and meaningful.

p.m. session

- Kinaesthetic starter activities related to numeracy.
- Review of how participants currently use learning styles approaches.
- Introduction to the Toolkit: an opportunity to handle and discuss how they might use items in the

Toolkit, not just to make delivery more motivating, but make learning, practice and assessment more effective, with the stress on having clear learning objectives.

- Participants given a planning sheet that could be used to focus on learning styles when preparing lessons.

At the end of the session participants were given a Toolkit to take away on loan for the duration of the programme. They were asked to try out some of the learning styles approaches and/or elements of the Toolkit with their learners before Day 2.

Day 2**Key objectives:**

- To evaluate recent attempts to implement a learning styles approach.
- To inspire participants to use a learning styles approach in relation to the eight stages in the numeracy learning process.
- To enable participants to plan how to implement a learning styles approach.

The trainers described the eight stages, or 'elements', in learning numeracy as follows:

logic	1. Bringing forward prior knowledge and remembered skills.	Confidence and language underpin the whole process.
global	2. Introduction to new knowledge.	
	3. Demonstration of new skill or process.	
conceptualise	4. Controlled practice.	
process	5. Free practice and word problem-solving.	
	6. Application.	
accuracy	7. Revision and retention.	
	8. Self-assessment, self-checking.	

APPENDIX 1

THE TRAINING PROGRAMME CONTINUED

Day 2 continued

The trainers emphasised that they did not intend that participants should use these eight stages as a rigid framework for teaching numeracy. The model can, however, play an important role in guiding teachers' decisions as to when and why they should use learning styles approaches and activities and, importantly, in relating activities to learning objectives.

Session outline

- Review of participants' use of learning styles approaches between Day 1 and Day 2; sharing what went well, what went less well, and discussing

possible responses.

- Modelling of learning styles approaches in the eight stages of numeracy learning, using a wide range of practical activities and equipment – e.g. dominoes, clocks, jigsaws, tape measures, board games, etc.
- Putting ideas into practice through planning a session using learning styles approaches.

All the participants had tried out at least a few approaches or elements of the Toolkit between Days 1 and 2 and were keen to share their experiences.

The session was held in a base room that housed a collection of equipment and resources, both commercially produced and made in-house, that participants could handle and use. The whole session was extremely lively and incorporated a wide variety of activities.

The wealth of ideas and stimuli might have been overwhelming but for the reassurance that participants should only make small, targeted, incremental changes that they felt comfortable with.

Day 3

Key objectives

- To discuss own learning styles and teaching approaches with peers, and use feedback to improve own practice.
- To develop own tactile and kinaesthetic materials for use with own learners.

a.m. session

- Small group discussion – sharing successful practice: what had they done, why, and what learning had taken place? Participants were asked to share one example with the whole group.
- Whole-group discussion focusing

on the learning that had taken place and highlighting problems and difficulties.

- Small group discussion – how to overcome problems/barriers.
- Share solutions with whole group.

p.m. session

- Divide into two groups: one group to create their own materials, the other group to use computers to develop and/or adapt materials. Groups to swap over half way through the afternoon.
- Show and tell.

This session brought practical tips together with peer support and review. All the participants had tried out further learning styles approaches and/or activities from (or inspired by) the Toolkit. They shared their experiences enthusiastically throughout the afternoon practical sessions. Participants were invited to work actively and to construct a 'chute', a device designed to ask and answer questions. (See appendix 4). Participants have continued to share ideas and resources via e-mail since the programme ended.

APPENDIX 2

RESEARCH INSTRUMENTS

Pre-project questionnaire

Part A. Information

Questions 1 – 3 requested personal / contact information.

Q.4 Gender

Male _____
Female _____

Q.5 Ethnicity

White _____
Mixed _____
Black or Black British _____
Chinese _____
Asian or Asian British _____
Other _____

Q.6 Age group

20 – 29 _____
30 – 39 _____
40 – 49 _____
50 – 59 _____
60+ _____

Q.7 Name of main place of work

Q.8 Where work (type of establishment)

FE college _____
Adult and Community Learning _____
Training provider _____
6th form college _____
Prison _____

Q.9 Length of time have worked for this organisation

<1 year _____
1 – 3 years _____
4 – 9 years _____
10+ years _____

Q.10 Role

Classroom teacher _____
Manager/co-ordinator _____

Q.11 Qualification(s) relevant to teaching numeracy

Q.12 Other teaching qualification(s)

Q.13 Full or part-time teaching

Q.14 Number of hours numeracy taught per week

<4 hours _____
5 – 10 hours _____
11 – 16 hours _____
>17 hours _____

Q.15 Number of years teaching numeracy

<1 year _____
1 – 3 years _____
4 – 9 years _____
>10 years _____

Q.16 Previous training in learning styles

Yes _____
No _____

Part B. Questions

Participants were asked to briefly list 1 – 3 key points in response to each of these questions.

Q.17 What was your motivation for volunteering for the training programme?

Q.18 Do you use a learning styles approach in your numeracy teaching at present?

Q.19 What do you expect the training programme will cover?

Q.20 How do you think the training will benefit your learners?

APPENDIX 2

RESEARCH INSTRUMENTS CONTINUED

Evaluation of session

Training session 1 / 2 / 3

1. What did you expect to gain from this session?

2. Did the session match your expectation?

Yes Mostly Partly No

3. Rate the following aspects of the session on a scale of 1 (very good) to 5 (very poor).

Relevance of content 1 2 3 4 5

Style of delivery 1 2 3 4 5

Response to questions 1 2 3 4 5

Quality of training materials 1 2 3 4 5

Overall assessment of quality 1 2 3 4 5

4. Which aspects of the session did you find most useful? Why?

5. List three ways in which you plan to use what you have learnt today.

Thank you for completing this form.

APPENDIX 2

RESEARCH INSTRUMENTS CONTINUED

Interview schedule**1 Prior perception of learning styles**

- a) Can you describe your understanding of learning styles before your involvement in this project?
- b) What prior training in learning styles and learning styles materials had you had before your involvement in this project?
- c) What did you consider to be the benefits of using learning styles approaches before your involvement in this project?
- d) Did you have any reservations about using learning styles approaches before your involvement in this project?
- e) Has your understanding of learning styles approaches changed since your involvement in this project?
- f) Have your perceptions of learning styles approaches changed as a result of participation in this project?

2 Prior use of a learning styles approach

- a) What learning styles approach(es) have you used prior to your participation in this project?
- b) What were your feelings about this work at the time? e.g. Very keen, very positive / rather diffident / doing it because expected.

3 Impact of the training programme

- a) What do you remember most / what made the greatest impression from the Day 1 training?
- b) What do you remember most / what made the greatest impression from the Day 2 training?
- c) Have you made use of any of the approaches used/described in the training?
- d) What elements of the training so far would you change?

4 Use of the Toolkit

- a) Have you made use of any elements of the Toolkit?
- b) Has the Toolkit in itself changed the way you approach lesson planning/ preparation of materials?
- c) How could the Toolkit be improved to suit your teaching setting?

5 Practitioner development

- a) What impact do you think this project will have on you as a practitioner?
- b) Would you do learning styles approaches differently now as a result of your participation in the project?
- c) In comparison with other CPD activity, how much has this training impacted on you?
- d) How, and in what ways do you plan to use the Toolkit and the training in your classroom practice?
- e) What, if anything, will you share with colleagues? How?
- f) What impact might this have on others within your organisation?
- g) What plans, if any, do you have for further development?

6 Additional information

Is there anything else you would like to add that has not been covered in the interview?

Prompts for group discussion

1. What is your understanding of learning styles approaches now?
2. What do you see as the value of the Toolkit?
3. What has fired your enthusiasm in this training?

APPENDIX 3

RESPONSES FROM THE IN-DEPTH INTERVIEWS

(To see the interview schedules, please go to appendix 2)

(i) Prior understanding of learning styles

All the participants stated that they had had some awareness of learning styles at the outset of the programme. However, their interview comments revealed that the majority had revised their understanding as a result of the training and use of the Toolkit. In particular, they reported that they had gained an understanding of how learning styles theory could be translated into practical strategies that could be used directly in the classroom. They had moved away from a vague understanding of learning styles as a way of categorising and labelling learners, towards the trainers' approach of 'taking into account a general knowledge and awareness of learning styles and models in the organisation, monitoring, assessment and delivery of teaching and learning'.



Thinking and learning styles – the correlation of how you think and how you learn – I hadn't really thought about that in any detail.

The college initial assessment questionnaires include something about learning styles – but I'm not sure that information is disseminated – we're paying lip service to the concepts.

Previously I had no concept of how I could apply this (learning styles) theory in my teaching.

... Most importantly I've now got some practical strategies for how I can use learning styles approaches in the context of numeracy.

I had no concept of how I could apply this theory in my teaching. ... I just didn't see the relevance.

None of this prior training had given me any practical strategies for using the ideas in my maths/numeracy teaching.

I hadn't explored the options – how could you teach numeracy in different ways? – that hadn't been even a consideration. It's a shame, but to be honest that's how it was.

I always had a problem with transferring what we got on the form (learning styles questionnaire) into any kind of action I hadn't really got to grips with what it meant.



(ii) Impact of the training programme

All the participants gave extremely positive feedback on the training. Particularly striking were their comments on the energy, enthusiasm and engagement that they had drawn from it.

It was also interesting to note that different aspects of the training had made an impression on individual participants. Some commented particularly on practical application, others on the theoretical frameworks, while some valued the design of the training, which gave them the opportunity to build up a gradual understanding. This indicates that the trainers were successful in modelling their key objectives (see section 4 (i) and appendix 1). This is well illustrated in the summary of the Post-its exercise on Day 2 (see section 6 (vi)).

It is clear from the interviews that the training had made an impact on the participants at a personal level, in their confidence, and on their classroom practice. These aspects are exemplified in the following quotations:



What it did was energise me to think about what I was doing in the classroom and what I could be doing and the benefit of producing non-worksheet-based resources that would make it easier for me in the classroom.

I'm much more enthusiastic. I can see how I can use learning styles approaches with my learners to make lessons more interesting and motivating – and, I hope, more effective.

I came back just buzzing with things.

Some training that you go to you can't make a connection to your teaching. I could see a direct application for this.

I like the practical training – because, after all that's what you do in the classroom.

The trainer encouraged us to think outside the box. It forces you to think, this training.

And what this training has done as well is get me interested in current thinking – what I can learn to ‘grasp’ the learners – to get them interested.

Day 1 was sort of: this is why; Day 2 was this is how. So I could see a logical progression, which is what I like.

The training was excellent and I found that I was really engaged.

It’s one of the most useful bits of training I’ve been on. I’m certainly going to continue what I’ve been doing.



(iii) Impact of the Toolkit

The participants were keen to see the Toolkit. Teachers like to see tangible materials. However, and interestingly, very few of them made much use of the professionally-made resources directly from the Toolkit itself. Most said that, as a result of the training, they were able to use the Toolkit as a source of ideas, strategies and inspiration for activities.

Several participants commented on the value of the Toolkit in demonstrating the approaches they had learnt about to other colleagues, including to those who taught literacy and ESOL. The attractive resources, which could be passed round and handled, held the attention of colleagues – including managers – and provided a good basis for explaining the activities and the rationale for the learning styles approaches.

There were some reservations about the weight and bulk of the Toolkit, and the fact that, once it was opened, it was difficult to repack.

Participants felt strongly that the Toolkit, in isolation, would have had very little impact without the training. It was the training that had inspired them to make use of the resources in the Toolkit, to make the most of them, and to go on to try other activities and approaches.



I loved the ‘suitcase’!

The ideas of the Toolkit are great.

The Toolkit’s an excellent idea – and I’d like to keep it! They should mass produce it and give it to every organisation. But I think the Toolkit won’t work without the training – no, the training’s more important. The Toolkit’s really good, but you can make those things yourself once you’ve got the ideas.

The Toolkit gives me the ideas.

A goodie bag. I like resources that are ‘different’.

(Need to think about) as well as what it’s teaching – the way it’s teaching - to think of extended uses.

It made a big impression on me – I just liked the whole thing – I came back here with my suitcase and was really enthusiastic and showed everybody.

What one colleague and I have done – we’ve gone through everything in the Toolkit and we’ve written a short description of each element and then put suggestions for how it could be used.

The Toolkit gives you something to show and to talk about (to other colleagues).



(iv) Confidence

One very striking finding from the interviews was how frequently the participants reported that they had gained in confidence as a result of involvement in the programme. It was as if they had been ‘given permission’ to try different approaches and this had made them feel more confident to experiment further.



I’ve been using these approaches now with much more enthusiasm and determination than previously – I’ve now got some theory behind what I’m doing to justify what I’m doing. I’m doing more activities – I see it as an expansion of what I’ve been doing already. I’m being bolder.

It’s moved me on to a different plateau!

I’ve been a bit brave this year.

It’s just being brave and going for it. It’s given me more confidence.

I didn't do it (use different approaches) as much as I do now – maybe I wasn't as confident.

Absolutely! I'm more confident in myself.It's given me ideas that I didn't think I could do.

I feel so much more confident.

It's extended the range of things that I can do.



(v) Impact on practice

When asked about their perceptions of the training and the Toolkit, all the participants reported changes to their classroom practice. They related these changes with enthusiasm, and it was clear that they felt that the changes had not only made numeracy teaching and learning more fun, but also more effective. There was a striking emphasis on the participants' perceptions of learners having more involvement in the learning, and, in many cases, of the learners taking more ownership.

Several participants were enthused with the planning approaches suggested during the training, which advocated giving learners a 'global' overview of the course. This could be clearly displayed on the wall as a poster showing the future of the programme. Participants felt that the impact would be even greater if this poster were put together by the learners with support from the teacher.



I think in the past I've tended to skip a lot of the activities in the workbooks and just gone from one set of problems to the next set of problems – thinking that games are a bit trivial. But this year I've made sure I've done the games that are in the book with the dice and the counters and everything as a natural part of what we're doing – this isn't a reward, this is just a natural part of what we're doing in the maths lesson.

Giving the overview – this is the idea that I love – getting the learners to say how they would use a topic and then looking at the skills you need to do that topic before you even start teaching it. That made a big impact on me: how important it is for the learners to know why they're learning something. Then at the end of the session you can go back and look at what you have done and what

else needs doing. It's a really simple idea, but it's a really good idea.

I'm thinking more about visual impact and the whole set-up of the room. Our standard layout is having the tables in a horseshoe. Now I've tried having the tables grouped together. And also trying to get them to move about more in every lesson – getting them to move by having them write things on Post-its and then come and stick it on flip chart paper: just trying to get more movement and interaction. It does help.

I like the idea of writing things down and having it on the wall – what they have already learnt and are going to learn. The learners love it - it makes the classroom theirs.

There's a lot more talk and discussion going on.

I'm trying to get away from worksheets – but using them when appropriate.

As a result of going on the training I've made sure that I explicitly do activities in the lesson – there's always a tactile element to what we're doing.

This has definitely made me enthusiastic and motivated again. You get bogged down with the targets, exam requirements and the rush, rush, rush – do this, do that. This has helped me take a step back and helped me think how I can do things differently. Yes, it's had a big impact. It's taken it back to why it's important for the learner.

Another thing I've learned is that it's not just down to me as a teacher. It's important to get them involved in making things – and they like it.

What I like is it takes the focus away from the teacher and onto the materials and the experience of the learner. I have some of the activities out on the table before the start of the lesson so they come in and start – so that's like revising what they did the previous lesson. Instead of just chatting – well they chat amongst themselves, but they're talking about maths. It gets them interested, – and they wonder what Miss is going to bring this time – so they enjoy coming to the lesson, it makes them want to come to class, so attendance has got better. That's all from this project.



(vi) Impact on planning

During the training, emphasis was placed on planning the learning styles approach into lessons and giving careful consideration to learning objectives before deciding on activities. These messages had clearly been taken on board by the participants. Although this aspect of practice was not explicitly probed during the interviews, participants were using a targeted rather than a 'pick and mix' methodology when they described use of learning styles approaches.

Participants recognised that incorporating these approaches and activities into teaching and learning required more preparation time. However, they perceived that this was a worthwhile investment, and some were already building up a bank of resources for future use.



This has definitely changed the way I go about lesson planning. My scheme of work is now up on the wall and a list of all the lessons, the topics. And then there are the student names up and the lesson plan that they're doing – so they can see that as well.

I've started to record it more. Like using the planning sheet to be sure I have covered it. It's all very well using an activity but what's the overall plan?

It's realising how to use it maybe as a starter, maybe as an ending activity as a recap, maybe in between two different sections.

These days I'm not just preparing the lesson but I'm trying to find out ways I can get them to understand better – to make the lesson lively. Also, when they get too noisy, to bring down the tone – get them to do something else. I can adjust quickly to circumstances, say, if it's a dull day and everyone's tired.

You can change the tempo in class to suit the mood and the need.

There's a benefit for me in doing activities at the beginning of the lesson – because it's energised the students – whereas when I do it at the end of the lesson I've energised the students and then they've gone off to another lesson! In future, I'd do these energising activities

at the beginning of the lesson where there's a benefit, a spin-off to me.

I find activities and laminate them on a Monday and cut them up because I know that this is going to benefit me on the Tuesday. And it's going to be there for future years as well if you've done a good job in preparing it in the first place. I'm trying to build up a bank of materials.

It feels like it's a lot more work, but then actually it's not. It's quite easy to think through – instead of giving them four questions you just think of an alternative way of putting the four questions: graphically or using the class or whatever. It's finding another way. It's the thinking.

Always the problem is having time to do things to prepare – it's a huge problem. But I long to do it!

I'm using activities to introduce topics and to assess learning and also to reinforce concepts and vocabulary. It's more work for me but it makes me think 'Oh, have I taken into account the visual learner, have I got the auditory one there, the kinaesthetic?' You know. I have to cross-check to make sure I have got everything there when I do my lesson plan. I'm doing more preparation now, but it's worth it – because we all enjoy ourselves.

**(vii) Benefit to learners and knowing learners better**

The participants perceived a range of benefits to their learners from using the learning styles approaches, including better motivation, more effective learning, increased participation, interaction and confidence.

They felt that, by using these approaches, there was a different balance between the time they spent delivering and opportunities to observe what their learners were doing and saying. Thus they were able to get to know their learners better and give more consideration to their experiences.



... Everything's changed – their body language: instead of sitting isolated and hunched and not interacting at all, now when I come into the lesson they're talking amongst themselves and they will participate.

...Also I think they're starting to realise that they can demonstrate their knowledge to others as well – and they're starting to do that. They're even starting to help each other which is really good.

...It's like a confidence thing really. It's not just about what you learn – it's how you feel about learning.

... They've been trying to learn in the way they've always been taught – which, bluntly, didn't work the first time.

Why anyone thinks it'll work the second time that way, I don't know.

(Prison tutor)

It's working for me, but, more importantly it's working for my students, definitely.

It's made me more alert to their [my students'] needs.

When they work with the Toolkit you can see what they are doing.

As far as my students are concerned I think these activities are really great. They get involved and they're having fun at the same time. And usually in college we're dealing with students who haven't done well in maths – so they have that 'thing' about maths. But with the introduction of all this it's like 'oh, it's easy'.

You see different sides of your students I think – by trying these different things you see different sides of their characters coming out and the type of person you thought they were is not necessarily the case.

... Since trying to do a few more interactive things, a bit more group work, they're coming out of their shells.

What I like is it takes the focus away from the teacher and onto the materials and the experience of the student.

It's when they are participating – and they are asking 'can you give us more?' Then I know it is 'bull's-eye'!



(viii) Knowing that learning takes place

Participants had taken on board the message that activities could be used to assess whether learning had taken place. They perceived this as an effective strategy – often helping them to better understand not only when learners had a problem, but the nature of the difficulty.

Some also reported improvements in learning and confidence on the part of their learners.



This (tactile) activity was certainly a learning check – by observing the students I could check whether they remembered the names of the shapes – and, if not, I could refer them back to the work they'd done previously – better than worksheets where students tend to rely on you to tell them whether they've got the answers right or not. It helped me to identify those students who didn't recall the terms we were using – corners, sides etc.

I've started using the topic overview idea a lot – it's a really good idea. It's working for me, but, more importantly it's working for my students, definitely. They're starting to see, I think, more of the relevance which is the important thing, the context, why do I need to do these things, how this is all linking to the next thing. That's how they're showing that it works. Before, when they used to record their learning in a learning plan, the 'What's next?' column was always blank. But now they can tell me what they're going to be doing next.

Some of the activities are good as a recap – I can tell whether the students have understood what they should have learned in the lesson. If not, I go over it again at the start of the next lesson, maybe in a different way.

These materials work because when they are open-ended you can see if they understand or not.

I felt positive that there was learning going on.

We brainstormed what we had learnt and retained. They (my students) were amazed how much. We've overcome the 'Can't do's'. Some of this year's students were with me last year, so I can compare now. Before, I would never have dreamt of giving them the cards to do themselves.

I've been giving them little tests (on paper) so I can judge

– and the results were phenomenal – I had a student joining and was told to watch out for this one. She got every sum right! She was so full of herself. You feel that it's working.

The minute they catch on their faces light up.

They would come back to it two weeks later, and find that they did really understand it.



(ix) Benefits of using the activities from the training and Toolkit with ESOL learners

Five participants used the learning styles approaches solely or partly with ESOL learners. They felt that an advantage of these approaches was that the learners could often demonstrate numeracy skills without being constrained by lack of the appropriate English vocabulary. In addition, they reported that their learners had improved their vocabulary.



The problem for some of them – because they were ESOL students – was articulating how they were distinguishing between some of the shapes – but despite the difficulty in expressing what they wanted to do in English there was clearly some good numerical thinking going on and refining their concepts of the properties of shapes.

Looking at a piece of paper is no good to my learners.

This year I've found that the students have a better recall of the names of shapes. The activities have reinforced the vocabulary along with the concepts, without me explicitly having to force them to learn the vocabulary – it's just come naturally out of what they were doing. It's something that I'd try again.

It's relating number to a context that they're familiar with and making it quite concrete and real – and showing them that maths has a place in life and somehow to translate that into maths – numbers, nominator, numerator. It was nice to see a connection being made.

I also teach numeracy to groups of ESOL students. I

think it's [using these approaches] a great idea because of the understanding it gives to the students.

I've asked my ESOL students to write 3-digit numbers on a sheet of paper and then line up in order from smallest to largest – and they did that. Then I asked them to line up in descending order and you could see them thinking 'What way is descending?' they were really thinking and learning the new words. I could also tell who had understood it and the numbers too.

They remember better – the activities reinforce the language and the labels.



(x) Reflecting

Participants reported that the programme had helped them think more carefully about how they planned and delivered their teaching and about the purpose of the teaching and learning activities they were using. They were becoming reflective practitioners.



I feel it was quite sort of seminal.

We've had a chance to practise and reflect on it before going back again.

You need a bit of distance and a bit of time to reflect.

It's made me think about the complex language and jargon maths uses (and I use), and how to make this simpler for them.

I always have done lots of activities anyway – but I've not consciously reflected on the fact before.

The project was very useful – you need a bit of an impetus to make you step back and think about what you're doing.

I hope it will make me a better teacher. I think I'm achieving a lot more now and I think it will continue. I'm thinking more now about what I do and how I can get my learners to learn. I'm constantly thinking – will this get the optimum result? I'm thinking, will my students gain from this activity, which one is better? I don't take an activity just because it's in the book, I think about it

and I may adapt it. I'm evaluating as I go along. If something doesn't work as well as I'd hoped, then I'm thinking about how I might change it.

Maths lessons can be fun!

It's really got me thinking. I feel I can develop more. I wake up and think of something.

I've learnt a few things about myself.



(xi) Comparison with other CPD programmes

The majority of the participants compared the professional development they had gained from involvement in the programme favourably with other CPD – including initial teacher training and current level 4 courses.

The main characteristic they cited was that it firmly linked theory to practice and modelled insights and strategies that they could use to improve the quality of their classroom practice.



This is in contrast to my level 4 course which is very theoretical.

I had some training as part of my teaching certificate – it included learning theories and how these should impact on your teaching but somehow we missed the gap about how learning styles could be turned into useful strategies and how these could be delivered. ... I didn't consider learning styles with my students at all really.

I think these teaching certificates ought to be looked at – so instead of looking at the theory they ought to look at the practical side of learning styles and how you can do it. More of that would be much more beneficial to me, I believe, looking back at it. You need more about how to turn theory into practice – they don't do that, and then when you're thrown into a classroom at the beginning of your teaching career, you do what others do – so we all go down the textbook line. It's how you're taught to teach – so that needs to be looked at.

This has been wonderful, a thousand times better than

the training on the core curriculum – that was a demonstration of complete obedience actually! I did a Post-compulsory Postgraduate Certificate in Education which was quite theoretically based – and learning styles wasn't really covered in that. Well it was covered a bit, in theory, but you don't learn a lot because you're not really doing it.

I had some training before, but nothing like this, nothing as detailed as this and not as practically orientated. What I like about this programme is that they give you lots of examples and they let you develop your own. We had practical examples – not just telling us about it, but doing it as well.

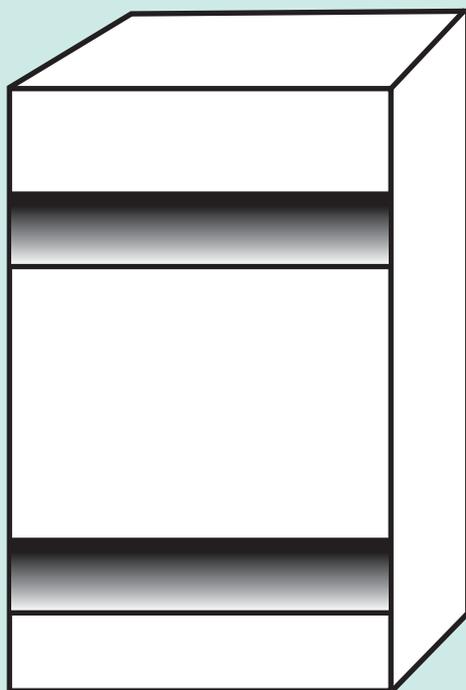
The strength of the training – a real positive – was how we were shown how to apply theory to practice. It makes it better than other training I've been on. Most of the training you go on is always talk, talk, talk – I like training to be more practically orientated, otherwise you forget things.

It's opened my eyes much more. Other stuff on numeracy for teachers has been paper-based.

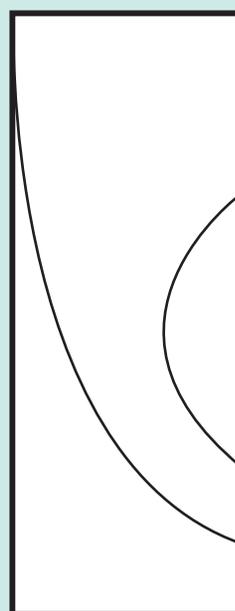


APPENDIX 4

FLIP CHUTE

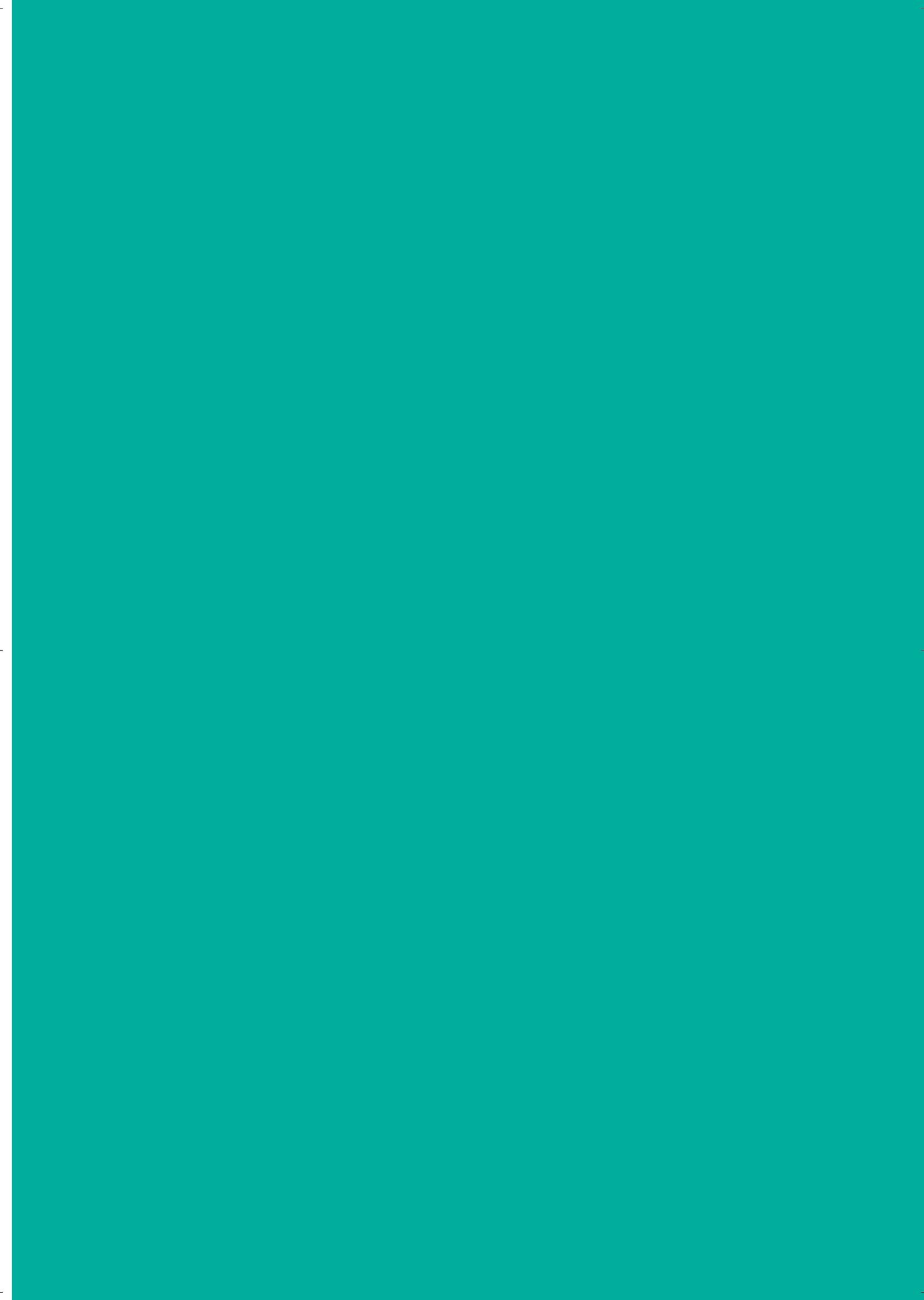


Cross-section



1. **Choose a carton** such as an empty wine box.
2. **Cut out two slits**, one near the top of the box, and one near the bottom.
3. **Cut out two strips of card**, the width of the slits. Make one strip longer than the other.
4. **Open the top** of the carton.
5. **Attach the longer strip** to the top of the inside of the box and the bottom of the lower slit with sticky tape.
6. **Attach the shorter strip** inside the box from the top of the lower slit to the bottom of the upper slit with sticky tape.
7. **Tape the top** of your carton back into place.
8. You should now have a **chute inside your carton**.
9. **Decorate** your carton.
10. **Make a set of cards** that you can post through your flip chute.
11. **On one side, write a question or statement** as suggested for learning wheels. **On the reverse side, and upside down, write the answer.** When the card is posted through the upper slit of the flip chute, it slides down and turns over, coming out of the lower slit with the answer showing. Magic!
12. **Stack the cards** with name, address, age etc uppermost.
13. **Now post each card through the top slot and see what happens!**





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- Basic Skills Agency
- Learning and Skills Network
- LLU+, London South Bank University
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- King's College London
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