



Le-MATH
**Learning mathematics through
new communication factors**
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MATHFactor
**Teaching and learning mathematics through
Mathematics communication activities**

Guidelines for Teachers and Students

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(Preliminary publication for evaluation purposes)*

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1. What is the aim of MATHFactor?

Background and Rational

Unfortunately, many pupils as well as parents consider mathematics to be a difficult and boring subject. Instead of studying mathematics (and other subjects) many pupils prefer to spend most of their time watching TV, playing electronic games or exchanging messages, photos, videos and playing games on their mobile phones. One way to attract pupils back to the “playing field” of education is to use similar tools (weapons) to compete with their “opponents”. That is to communicate the learning of mathematics using non-traditional methods such as with games, through theatre or using competitions similar to the well-known X-Factor etc.

Many pupils claim that mathematics is too abstract and therefore non-approachable. This proposal uses a completely different and new approach by inviting teachers and pupils to apply new communication methods of learning mathematics, which are fun, enjoyable and functional at the same time. The pupils can “play and learn”.

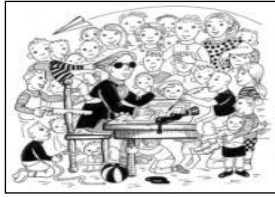
“The aim of the MATHFactor is to encourage students to stimulate the imagination of the public and express mathematical ideas using theatrical skills to a non-specialist audience.”



2. Why Mathematics Communication

Improving communication skills is very important as these are a form of social skills. The communication of mathematical ideas requires a special approach as the theories initially seem abstract or symbolic and oral explanation is sometimes problematic. Learning to communicate mathematical theories orally is a positive challenge for teachers and pupils

Communicating with classmates, communicating with the teacher or communicating with a non-specialist audience brings many advantages to school pupils. The self-esteem and confidence of the pupils will increase which will assist them later in life in job searching and in many professions such as teaching, researching, reporting, managing, marketing, etc.



2.1 Why communicate mathematics to the public?

2.1.1 To promote a mathematically and technology literate workforce

- To enable citizens to play an informed role in their democracy
- To reclaim mathematics and science's place as a part of main stream culture
- Universities: to encourage students to study for a mathematics degree which is currently in decline
- Learning Societies and Institutions: to maintain their membership base and promote the value of their disciplinary area in mathematics
- Government Agencies: concerns about the ability to compete globally as a knowledge based economy
- Private sector: need for new ideas and talent

2.1.2 To enable citizens to play an informed role in their democracy

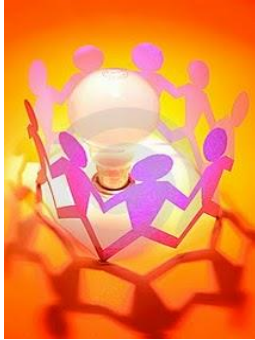
- Research Funders: to assure support for expenditure on research from the general public
- Government Agencies : to assure the acceptance of innovatory technologies within society
- Private sector: to assure a return on investment in new technology

2.1.3 To ensure that mathematics are an integral part of everyday experience

- Educators [at all levels]: to educate the general population that mathematics is omnipresent and universal
- Mathematical Scientists: to be valued and trusted

2.1.4 Important attitudes to mathematics to be considered during communication of mathematics:

- Fascination:** seek out mathematics in the media
- I am amazed by mathematics and how its application is making our lives healthier and safer
- Tolerance:** passive but generally supportive
- Mathematics is making our lives easier and more comfortable
- Fear:** distrust of motives of mathematical scientists and their funders
- Rules will not stop researchers doing what they want behind closed doors
- Indifference:** low priority concern, out of reach
- Mathematics is too specialised for most people to understand it



2.2 How to communicate mathematics to the public?

2.2.1 The variety of approaches to mathematical communication fall into two categories:

- Direct interaction
- Media coverage

2.2.1.1 Direct Interaction

Positives

- public meet a mathematician
- control of content
- two way communication

Negatives

- small audience
- low sustainability
- preaching to converted

2.2.1.2 Media coverage

Positives

- potential to reach a large audience
- agenda setting [opinion formers/decision makers in audience]
- audience selection

Negatives

- lack of control
- [Open discussion and interpretation are difficult to control]
- limited focus [discussion may take a non-mathematical focus which is better understood by the public]
- one way communication [without a discussion is involved, the audience may lose interest]

2.2.1.3 What are the types of direct interaction?

- Talks
- Round Table discussions
- Displays
- Posters
- Public Events
- Performances
- Science Centres
- Festivals

2.2.1.4 Some analysis of direct interactions:

Talks

- Based on the lecturing model;
- Predominantly a one way communication tool; although could be made for questions and answers, talks are not usually a discussion.
- Focused on facts; can be problems with talking at the right level for a particular audience
- Highly transferable; once devised a lecture can be delivered on many occasions

Round Table Discussions

- communication in depth
- phase to phase interaction
- debate type discussion

Displays/Exhibits

- Experienced by individuals or small groups rather than by audiences
- experience can be open-ended; allowing people to choose the level at which they wish to be addressed etc
- possibilities for two way communication; principally one to one encounters
- Require high levels of attention;

Poster campaigns

- Reach audiences other than “the converted”
- Place mathematics in everyday contexts, like transportation
- Large potential audience; although can be hard to evaluate the real numbers engaged
- Better suited to one way rather than two way communication; although can be used as tip of an information pyramid
- Graphics and textual styles are audience selective
- Can be reproduced in different formats
- Contagious because easily adapted for specific contexts and purposes

Public Events

- Combination of many activities
- Conference

Performances

- Theatre
- Musical
- Comedy

Science Centres

- May include performances, displays, etc

Festivals

- All of the above



3. Mathematics Communication Factors for learning mathematics in the school environment and beyond



3.1 Motivation

3.1.1 What is the motivation?

- It is the force that activates and addresses the behavior
- It is the fuel that allows us to carry out what we propose

“If we want to build a ship, it is not enough to get a group of workers together and give them instructions and distribute the work to them. We must inspire them to want to discover the far seas.”

by **Antoine de Saint-Exupery**



For what motivation is useful?

An individual on many occasions needs a stimulus or a "booster". Motivation acts as such, in order to encourage us to fulfill our aims or to satisfy the needs of the person. For this reason the motivation is useful to stimulate someone to do what they need to or should do for their own benefit and that of others.



Avoid being a prisoner of the wave of discouragement and daily pessimism

Motivation has two main sources. It can come from the internal needs of the individual or it can arise from outside pressures and external incentives



From a technical point of view motivation is the aptitude to direct energy in a specific direction with a specific intention.

From the emotional intelligence it means using our emotional system as the engine to support our motivation in functioning.



3.1.2 Elements of the Motivation cycle

- Reason
- Confidence
- Optimism
- Enthusiasm
- Perseverance
- Resistance
- Achievement

Reason

The top of the cycle, which encourages us to do something

- I would like to become a teacher
- I am going to win the competition
- I would like to help more every day
- I would like to do more sport

Confidence

- Feeling of self-sufficiency (link with self esteem)
- I am able to achieve this goal
- There is a motivation if I believe in me or someone inspires me.

Optimism

It's the belief (thought and feeling) that this goal is possible to reach

Still having a reason and confidence in myself I cannot approach a task believing I won't finish it.

Enthusiasm

It is the initial energy to plan or to execute something.

It is the energy, which puts something in movement.

Perseverance

It is the aptitude to realize a task or make continuous efforts to reach a certain aim.

Despite having a reason, confidence, optimism and enthusiasm we cannot achieve something without the capacity of persistence.

Resistance

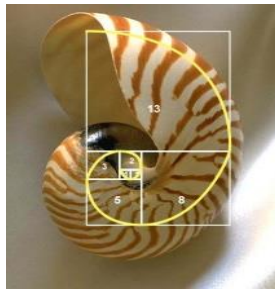
It is the aptitude to face up to misadventures, unforeseen occurrences failures and adversity that often arise when trying to achieve a goal.

Despite having a reason, confidence, optimism, enthusiasm and perseverance, it is difficult to achieve a goal without the capacity of resistance.

Achievement

It is the completion of the cycle.

When having had an initial reason, and confidence in yourself, optimism to believe it is possible to achieve the goal, enthusiasm to make the first steps, perseverance keep trying and resistance to handle the misadventures, the unforeseen, adversity and repeated failures, finally you succeed.



3.2 Content

The field of mathematics is very wide and its applications are unlimited. Content which may be particularly useful, for a short oral presentation could be?

- Abstract mathematics to make it easier to understand using paradigms and parallels from everyday life
- Applications of mathematics that explain how science and technology work and how mathematics is involved.
- The explanation of physical phenomena using simple mathematics

Many such examples can be viewed in the You-tube video data base for MATHFactor 2012 and 2013 found in the sites, www.euromath.org and www.le-math.eu

Basically, almost any topic of the curriculum could be used with a creative approach.

3.3 Presentation

Clarity

Presenter becomes the leader and the teacher!

- Popular science: popular math topics which can be presented in a more lively way, with real life examples
- Math props (see video examples)

3.3.1 The six key attributes of any presentation

- Simplicity
- Accuracy
- Credibility
- Emotion
- Surprise
- Stories

1. Simplicity

- Do not over complicate the subject. Typically the simpler language you use, the better your audience will comprehend your presentation.
- Do not however over simplify to the point of making assumptions without ample explanation of your hypothesis.

2. Accuracy

- Make sure that your hypothesis and conclusions are correct.
- Although the result may be correct, do not assume that your methodology is correct.
- Double check your workings.

3. Credibility

- Use credible sources. Just because it's on the internet it does not mean its correct.
- Often you may find different opinions or positions for the same subject. To maintain you credibility you must note all credible opinions.

4. Emotion

- Using your emotion helps you stress points within your presentation.
- By promoting audience emotion you will achieve better understanding
- Often the audience will remember your presentation as a result of the emotion imposed to them during the presentation.

5. Surprise

- Surprising your audience will grab their attention
- Even if the conclusion of the presentation is well known to the audience, introduce it in a surprising way.
- You can often introduce an invalid fact or hypothesis (which you could reiterate later on) in order to introduce an element of surprise.

6. Stories

- A story will often help convey a message more clearly than a formula or a technical solution to a problem.
- Associate with the story, make it about you or about the audience.
- Try to find well known stories and associate the facts to your hypothesis / conclusion.

3.3.2 Improving your presentation style

To strengthen your presentation skills, focus on improving your skills in these areas:

- A. Verbal and non-verbal communication,
- B. Effective use of the visual-aids, and
- C. Effective and meaningful organization of content.
- D. Deal with nervousness

A. Verbal and Non-Verbal Communication

- **Know your audience** Visit the room ahead of time to familiarize yourself with its size and layout. Find out who your audience is
- **Use the room as a stage.** Move around to engage and interact with your audience. Do not stand in one spot the entire time. Move with purpose; do not walk aimlessly.
- **Prepare.** Preparation is essential. Successful presenters are well prepared for the subject. Practice in the room if you can. In addition, prepare yourself emotionally and psychologically by taking the time to organize your thoughts.
- **Speak loudly and clearly.** Project your voice and face your audience when you are speaking. Speak slightly louder than you do in a normal conversation. Use a microphone if necessary. when you turn to the chalkboard momentarily.
- **Modulate the tone, pitch, and speed of your speech.** Do not speak in a monotone. Vary the pitch and speed of your voice for emphasis and effect. Use appropriate pauses. Rather than using filler words such as “uh,” for example, simply pause before moving on to the next idea or point.
- **Use gestures and facial expressions to help you explain, emphasize, and communicate.** However, be careful not to develop distracting habits such as pacing or repeatedly adjusting your glasses or hair. To find out if you are unconsciously doing anything that may be distracting to your audience, have a friend observe one of your presentations.
- **Develop a presentation persona.** Decide how you want to be perceived and what mannerisms you want to have. For example, do you want to be quiet, humorous, formal, or informal? Whatever persona is right for you, aim to convey confidence and ease. Move with certainty and assuredness, and be careful not to seem pompous or intimidating.
- **Show passion and enthusiasm for the topic.** If you are not interested in the subject, you cannot expect your audience to be interested, either. Point out the fascinating aspects of what the subject is about.
- **Do not read your notes or slides.** Doing so will lower your energy level and lead your audience to feel less engaged.
- **Interact with and pay attention to your audience.** Make eye contact with the audience, not with the wall. Build a rapport with the audience. Make sure the audience is with you (following and understanding what you are discussing). If they appear to be lost, take additional time to explain points and to answer questions.
- **Do not take yourself too seriously.** Be able to laugh at yourself and your mistakes. Feel free to bring humour into the presentation, but direct it at yourself, rather than at your audience.
- **Keep track of the time.** Do not start early or end late. Make full use of your allocated time. The audience often do not recall or listen to information presented after the period is technically finished.

B. Effective Use of the Visual-Aids in the concept of a classroom

Using Visual Aids (presentation pad)

- If you use a presentation pad, write legibly and big enough that your writing can be seen in the back of the room.
- Think about the organization of the material on the pad.
- Fill one page at a time, starting at the top of each page and writing down.
- Do not crumple in words at the very bottom of the page or in the margins.
- Underline or mark major assumptions, conclusions, etc.

- Use colour to emphasize points. Determine which colours are most visible in the back of the room and use those.

Using Visual Aids

- Do not use visual aids unless they serve a clear and important purpose.
- Visual aids should aid quick comprehension and support the main points.
- Make sure that you have with you all visual aids and that they function as they should
- Talk to your audience and not to the visual aid.
- Use the visual aids to enhance your presentation, not as a *substitute* for a verbal presentation.
- Use a pointer, if necessary.
- Coordinate the audio / video (if applicable).
- Use too few visuals rather than too many. However, exactly the right number of visuals is the goal!
- Design your visuals with clarity and simplicity in mind.

C. Effective and Meaningful Organization of Content

- **Plan the content.** Think about the presentation, the goals, the type of material to be presented, and the type of aids, if any, that you are going to use.
- **Provide a structure.** Each presentation should have a beginning, a middle, and an end.
- **List objectives or provide an outline at the beginning of the presentation.** Providing an outline helps the audience identify the most important points and follow the presentation more effectively.
- **Organize the content with a theme or storyline.** How do you want to arrange the content? How does each part of the presentation relate to what comes next.
- **Allow for pauses and “wait-time.”** Do not be afraid of silence. Most presenters use a 1-3 seconds of “wait time”. However, increasing the wait-time to 3-5 seconds dramatically increases the result of the point you wish to make.

D. Dealing with presentation nervousness, especially in live presentations

- **Be nervous** A certain amount of nervousness is vital for a good presentation. You need the extra energy to communicate: What you feel when you stand up in front of people is the urge to either run away or fight. If you endeavour to stifle those feelings you will be inhibited, restricted, artificial and wooden. The added adrenaline will keep your faculties sharp and ready to engage with your audience.
- **Breathe** Extra adrenaline, however, can result in shallow upper chest breathing and tension. Taking a slow, deep breath, breathing fully out and then in again, will relax you. Strangely having something to pick up and put down tends to release your breathing.
- **Get something else to do** It may seem an odd idea, but our bodies seem to feel better when they have some sort of displacement activity to occupy them. It's the reason people hold pens and fiddle with things. A limited amount of this sort of activity will not be too obtrusive and can make you feel a lot more secure.
- **Hold on to something** When you start you are at your most insecure. Avoid all the well-meant advice about what you are and are not allowed to do. Until you feel settled do anything you can find to make yourself feel secure. This includes holding on to a lectern. Even just standing next to something solid will make you feel less wobbly.

- **Go slow** The breathing tip above will help you to slow down your presentation. Go more slowly than you think necessary to avoid gabbling. Your audience need the time to assimilate and interpret what you are saying. It's a fact that when adrenaline is flowing your sense of time is distorted and what seems OK to you may look like fast forward to your audience.
Trust yourself If you do not think you are up to a particular presentation get help. Some people have better presentation skills that they think they do. Recognise what you have. If you doubt your ability to think on your feet, for example, then follow a strict rehearsed presentation

3.3.3 Making a presentation

Research your audience

Do whatever you can to understand your audience BEFORE you prepare your talk so:

- Think of your talk from the audience's point of view.
- Plan, prepare and deliver your talk always with the audience in mind.
- Ask yourself what kind of people are they?
Are they overwhelmingly of a specific age range/male/female etc?
What do they need from me?
What do they already know?
What is likely to interest them?

Preparing your talk

- Prepare a talk by talking. Say your ideas out loud to yourself first and THEN write notes for yourself to record your thoughts
- Most people write a script or set of notes and then try and turn it into a talk.
- A talk is designed to be seen and heard not read. So start as you mean to go on and let any notes grow out of your talking to an imaginary audience

Audio-visual aids

- Remember that audio-visual aids are there to serve your message and not the other way around.
- Don't use powerpoint as an autocue slide show , stick to interactivity.
- Beware your favourite picture or story. Check them for relevance.
Don't overwhelm your audience with material. Give them information they are ready to understand at a pace they can absorb it

Rehearse [but not for ever]

- For an important talk a rehearsal is essential. A rehearsal is not a read through of the notes. It's giving the talk in every detail without the audience, but with some people who you trust to give useful feedback . This way you sort out your message content as well as issues like whether the audience can see and hear you properly or whether you can easily cue your slides etc.

How to behave and move

- Be yourself – your uniqueness is what makes you interesting
- Be prepared to do something about any distracting habits.

- Use your body language. Be expressive with your face, your hands, your voice, and your eyes.
- Constantly scan the whole audience - (but at a leisurely pace). Don't just talk to one person.
- Talk in a natural voice, as if you were chatting enthusiastically to one person;
- Act confidently – even if you don't feel it. To act is to be! (At least for the time you are in front of your audience).
- Grab the attention of the audience early on. But make sure your attention grabbing ideas focus attention on your message and not on you. Wearing a sequined suit or setting off fireworks will make you memorable but will probably not engage the audience with your message. (Unless your message is about the joy of sequins or the wonder of fireworks).
- By all means be funny (when appropriate). But don't feel you have to be a stand-up comic. Telling jokes is a highly skilled business. Find your own sense of humour and your own style.
- If you plan to say something funny, be prepared to keep going if they don't laugh.
- Keep on learning. Get into the habit of noticing both good and poor communication. What made it work or fail? Take inspiration from radio, TV, advertising, lectures, talks, books, magazines, friends and family etc. Keep a notebook and jot down any good ideas that come to you.
- Make a pact with someone who you trust to be a 'critically supportive friend'. This is someone who is on your side and wants to help you get better and who will tell you what works and what doesn't. You can do the same for them. Responding to accurate feedback is the only way to improve a skill.

Keep it varied

- Audiences are in a constant state of losing interest. This isn't personal, it's natural.
- Vary your pace making regular changes like pictures, sound, physical objects, personal stories
- Change the medium you use to illustrate things, anything you can to introduce something different
- Keep them wondering what's going to happen next.

Use illustrations

- Make points using analogies and metaphors.
- End definitely, clearly and on time
- When designing the end of a talk ask yourself "what do I want them to do next?" Is your ending likely to achieve your goal? If not revise it.

3.4 Being filmed or recorded

Where to look

- The normal approach is to look at the interviewer wherever they may be situated. They may be 'on camera' themselves or sitting or standing next to you
- DON'T look at the camera and generally avoid moving your eyes in a horizontal direction. Looking up or down briefly looks fine.
- Looking directly at the camera breaks the illusion that the viewer is eaves-dropping on the conversation. Looking across the camera makes you look untrustworthy.

- When doing a 'piece to camera, imagine the camera is a person. Preferably someone you know and like.
- Don't 'address' the audience – 'chat' to a person – TV and radio are intimate media. You may have 2 million people watching, but they are watching as one or two individuals.
- Your TV image is not like your real life image. The only way to see how you are coming over on TV is to watch yourself on TV via a camcorder.

Arm waving

- Animation is good! Gesturing with your hands and being expressive with your face adds energy and interest.
- Just don't be too wild with the arm movements – you'll look mad! The tighter the shots, the closer your upper arms need to be to your body.

What to wear for TV

- Avoid tight stripes (horizontal or vertical) – you will 'strobe'
- Avoid too much white – cameras don't like it and you can look washed out
- Avoid distractions like huge earrings or gaudy ties – unless you are doing it deliberately.
- The key idea is to plan how you look, not to just let it happen
- If in doubt, dress like a news reader.

Get comfortable

- A good sitting position for an on camera interview is to push your bottom well back in the chair and then lean forward slightly.
- Before being filmed, you can ease facial tightness by exercising your face. Try making as many ugly faces as you can!
- Try looking down for a few seconds, looking up just before doing your piece to camera.

For Radio

- Use your hands and facial gestures, even though people can't see you. It will make you more natural and more expressive.
- Avoid jewellery and clothing that makes a noise like a collection of bracelets and things like squeaky leather jackets.
- Try not to remember your lines exactly - just keep the sense and key information in mind.

Scripts

- Don't be afraid to make minor alterations in scripts to suit your way of saying things.
- Scripts for radio and TV should be lean, straightforward and always designed to be heard and not read. So SAY the text to yourself first and if it sounds like something you would actually say then include it in your script.
- Often you will be asked to give some 'level'. This involves you talking for a bit so that the sound operators can set the equipment appropriately to match the power of your voice. Keep talking – it doesn't matter about what – **at the level you expect to use in the interview/ piece to camera/ microphone**, until someone asks you to stop.
- Be careful not to move out of shot once the shot has been set up.

3.5 Attracting Media attention when public event is organized

The journalists' questions

- Who?
- What?
- Where?
- When?
- Why?
- How?

Writing a Press Release

- Sort out your 5Ws and an H
- Identify Your Story's Angle. A good story angle must have the following three attributes: · It must be the most important fact in your story. · It must be timely. · It must be newsworthy
- Create a Catchy Headline. Keeps the headline short and simple using less than ten words. It should convey the key point raised in the opening paragraph in a light-hearted manner that catches imagination and there attention
- Write in the Third-Person Voice. A press release must be presented objectively from a third person point of view so remove "you", "I", "we" and "us" and replace them with "he" and "they". · provide references to any statistics, facts and figures raised in the press release.
- Draw conclusions from facts and statistics only - not general opinion.
- Provide "Quotes" From the newsmakers. Put the most important message down into a quote. Journalists always use quotes from the newsmakers to add an authoritative voice to their reports.

4. Evaluation: in-school/in-public

Evaluation and assessment may be useful for the following:

- Possible evaluation-grading
- Prepare students for general communication exercises
- Not looking to substitute formal teaching methods and grading
- Relating to things that students are interested in (sports, social nets, shows etc.)

Factors: **Content/Clarity/Charisma**

- **Content:** related to maths, not trivial, relevant, correct, meaningful
- **Clarity:** logical, comprehensible and correct language, start→end completeness
- **Charisma:** contact, voice-face-body expressivity, creativity-originality, good use of props (see further analysis in the suggested assessment chart)

Teachers and Jury as interviewers

Planning

Plan your interview like a walk in the mountains. Know your path you are going to follow and have estimated start and finish times.

Listen on what people say and allow yourself to leave the track if it seems appropriate; but always return to it

Briefing the interviewee

- Discuss your interview with the interviewee
- Tell them the areas you will explore on your “path”
- Don't tell them the exact questions you will ask; they may rehearse answers and sound wooden.

Questioning style

- Ask open questions: How? Why? What? Where? When? Where? Who?
- If you ask closed questions that can be answered by yes or no that's all you might get.

Relaxing the interviewee

- If you are recording an interview for radio or TV point out that it's easy to rerecord
- Don't ask questions you care about first. Let them settle into the interview and start to forget the camera/microphone
- On stage be clear, demonstrate that you have understood, be responsive to what they say. And, when appropriate, keep it light.

Don't talk over your interviewee

- On recorded radio particularly and recorded TV (if you are out of shot) don't make agreeing sounds. If you say things like "uh hu", "really?" "amazing" etc, the material will be impossible to edit
- Instead, encourage your interviewee by nodding and smiling.

and finally.....

- DON'T let them listen to recorded material before it is broadcast. They may want to edit and change it.
- Do make sure you have their name – correctly spelled - appropriate description (eg managing director of... or professor of biology at ...etc) and contact details. Also make sure you have signed permission, by them or their guardian if under age, to use the material.

MATHFactor Suggested Assessment Chart

The Assessment factors are those suggested for the competition but they can be used by teachers by adapting them to their own environment

The assessment concerns:	Qualitative levels		
	Lower	Intermediate	Higher
CONTENT The degree to which the student demonstrates understanding of mathematical concepts and relationships between these	Displays basic knowledge	Displays good knowledge	Displays excellent knowledge
The quality of the student's analysis, conclusions and reflections, as well as other forms of mathematical reasoning	Uses some substantiated reasoning to make the mathematics understanding easy	Uses acceptable mathematical reasoning to make mathematics understanding quite easy	Uses excellent mathematical reasoning to make mathematics understanding very easy and almost obvious
CLARITY The quality of the communication. How well the student uses mathematical expressions (language and representation)	Expresses him-/herself simply, but understandably, using a mathematical language and approach suitable for the topic and non-expert audience	Expresses him-/herself clearly using a mathematical language and approach suitable for the topic and non-expert audience	Expresses him-/herself very clearly and confidently using a mathematical language suitable for the topic and the non-expert audience
CHARISMA	Displays some adaptation to the audience, e.g. by	Displays relatively good adaptation to the audience by	Displays good adaptation to the audience by looking

	<p>looking up, speaking clearly and/or showing commitment.</p>	<p>looking up, speaking clearly and presenting facts in an interesting <i>or</i> engaging way. Presentation and body language that causes impression the audience</p>	<p>up, speaking clearly and presenting facts in an interesting <i>and</i> engaging way. Presentation and body language that causes impression and excitement to the audience</p>
<p>CHARISMA further analysis discussion</p>	<ul style="list-style-type: none"> • 1924 Max Weber defined Charisma (English translation from Wikipedia): “Charisma is a certain quality of an individual personality by virtue of which he is set apart from ordinary men and treated as endowed with supernatural, superhuman, or at least specifically exceptional powers or qualities. These are such as are not accessible to the ordinary person, but are regarded as of divine origin or as exemplary, and on the basis of them the individual concerned is treated as a leader.” • To be truly charismatic, you need to be able to not only impress and charm a group of people, but you should be a person who is good at engaging others and always have something interesting to say, so people will naturally listen to you. Charisma is something you do to cause impression and excitement to the person watching. Charisma is not the same thing as confidence, but appearing confident can make the student more charismatic because his/her confidence will put others at ease and inspire faith in the speakers’ abilities. Is the student speaking with confidence and at ease? When saying something important you need to say it with conviction. This is acquired by speaking clearly with a relaxed pace. To keep the speech interesting and emphasize the most important words the student needs to vary tone of voice, rhythm, volume and pitch. By using body language well the student becomes an effective and charismatic communicator who appears trustworthy and competent. Also by using the body language the students show that they are engaged and committed. The posture should be tall and straight, with uncrossed arms and hands away from face. If you are passionate about something your gestures communicate this, and you use gestures in order to emphasize and explain the content of the speech. Another important aspect for good contact with the audience is eye contact. The student should look the audience in the eye and engage them with eyes not only voice. • Use intuition and if what you see impresses you as a performance of above standard and special and unexpected then what you see is charisma. Some of us may see charisma and some of us may not. When we see it, we want to assess highly, when we do not we give a lower mark. 		

5. ANNEXES

5.1 Le-MATH Manual of Good Practices (visit www.le-math.eu)

5.2 Sample videos of MATHFactor 2012 and MATHFactor 2013
(visit: www.euromath.org, www.le-math.eu)

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