

Learning to Learn - Metacognition

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Tuning in...

1. Read the following poem
2. Read for understanding (learning objective)
3. Explain the metaphors to the person sitting next to you (success criteria).

You're by Sylvia Plath

Clownlike, happiest on your hands,
Feet to the stars, and moon-skulled,
Gilled like a fish. A common-sense
Thumbs-down on the dodo's mode.
Wrapped up in yourself like a spool,
Trawling your dark, as owls do.
Mute as a turnip from the Fourth
Of July to All Fools' Day,
O high-riser, my little loaf.

Vague as fog and looked for like mail.
Farther off than Australia.
Bent-backed Atlas, our traveled prawn.
Snug as a bud and at home
Like a sprat in a pickle jug.
A creel of eels, all ripples.
Jumpy as a Mexican bean.
Right, like a well-done sum.
A clean slate, with your own face on.



Metacognition

- ▶ Metacognition is a term used to describe the processes involved when learners plan, monitor, evaluate, and make changes to their own learning behaviours.
- ▶ The prefix ‘meta’ refers to higher-order cognition about cognition, or ‘thinking about one’s thinking.’
- ▶ It is often considered to have two dimensions: *metacognitive knowledge* and *metacognitive regulation*.

Metacognitive knowledge

The learner's knowledge of:

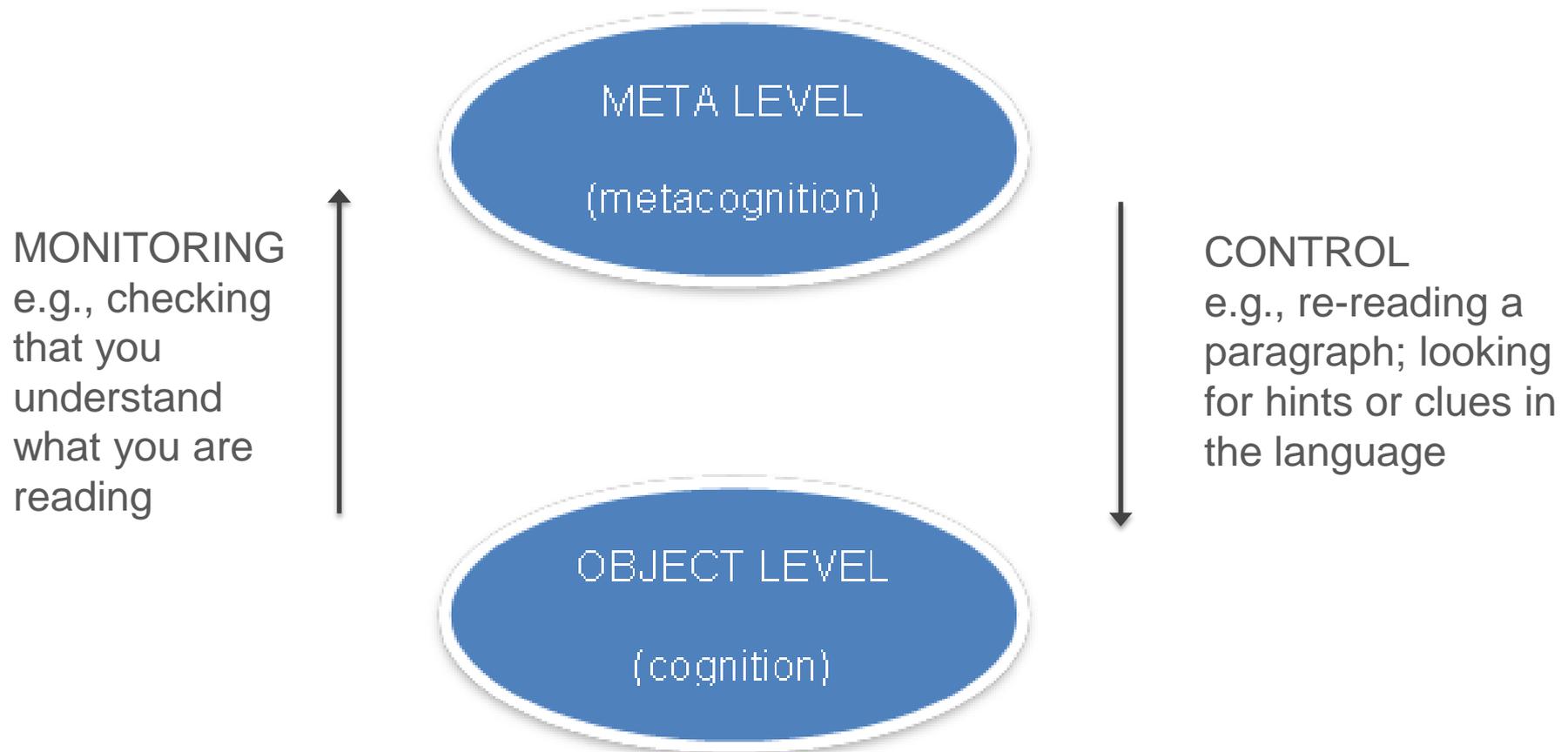
- ▶ their own cognitive abilities
 - ▶ eg, I enjoy language and acquiring new vocabulary; “I’m good at English”.
- ▶ particular tasks
 - ▶ eg, the language and metaphors in the poem we read were initially complex;
- ▶ different strategies (including when to use these strategies)
 - ▶ eg, read a poem slowly, several times, pausing over difficult words or sentences; read aloud; look up words I do not know in a dictionary.

Metacognitive regulation

Metacognitive regulation describes how learners monitor and control their cognitive processes.

- ▶ Eg, a child realising the strategy they were using to solve a maths problem was not working and trying another approach.
- ▶ Eg, re-reading a poem several times, concentrating on ‘difficult’ words where necessary, for understanding.

How does research help us?



Nelson and Narens (1990) Model of Metacognition

Four levels of metacognitive learners



(Perkins 1992)

Impact

“Too often, we teach students *what* to think but not *how* to think.” - OECD Insights (2014)

Impact

- ▶ Metacognition helps students to become independent learners
- ▶ High impact across a broad range of abilities and learning domains
- ▶ Strong evidence base
- ▶ Low cost

Hattie (2009) – **effect size of 0.69** for metacognitive strategies

Impact



Search Site



Evidence and Data

Teaching and Learning Toolkit

About the Toolkit

Using the Toolkit

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TA Campaign: Report

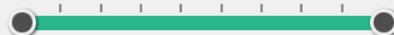
TA Campaign: Advocacy Partners

Toolkit Filter



Keywords

Average Impact



Cost



Meta-cognition and self-regulation

High impact for very low cost, based on extensive evidence.



+8 months

Download Approach



What is it?

Meta-cognition and self-regulation approaches (sometimes known as 'learning to learn' approaches) aim to help learners think about their own learning more explicitly. This is usually by teaching pupils specific strategies to set goals, and monitor and evaluate their own academic development. Self-regulation means managing one's own motivation towards learning. The intention is often to give pupils a repertoire of strategies to choose from during learning activities.

How effective is it?

Meta-cognition and self-regulation approaches have consistently high levels of impact, with pupils making an average of eight months' additional progress. The evidence indicates that teaching these strategies can be particularly effective for low achieving and older pupils.

These strategies are usually more effective when taught in collaborative groups so learners can support each other and make their thinking explicit through discussion.

The potential impact of these approaches is very high, but can be difficult to achieve as they require pupils to take greater responsibility for their learning and develop their understanding of what is required to succeed. There is no simple method or trick for this. It is possible to support pupils' work too much, so that they do not learn to monitor and manage their own learning but come to rely on the prompts and support from the teacher. "Scaffolding" provides a useful metaphor: a teacher would provide support when first introducing a pupil to a concept, then reduce the support to ensure that the pupil continues to manage their learning autonomously.

How secure is the evidence?

Videos and Case Studies

Toolkit Talks: Meta-cognition and self-regulation



Toolkit Case Study: The Skills Programme at EGA, London



Pupils get involved in community projects and hear guest speakers from local business and industry.

Strategies

Metacognitive approaches typically involve:

- ▶ teaching students specific strategies to set goals, monitor, and evaluate their own learning progress
- ▶ creating a learning environment that supports the development of metacognitive skills.

Strategies

- ▶ It involves **making learning goals explicit**, helping students to **plan strategies** and then ways of **monitoring their progress** towards achieving these goals.
- ▶ Encouraging discussion of strategies in class helps students understand when to use certain strategies, how they impact on their learning, and why the strategies work.

Over to you

What strategies do you currently use to help students:

- ▶ know what success looks like (intended learning outcomes)?
- ▶ plan how to get there?
- ▶ to monitor how well they're doing in their pathway to the intended learning outcomes?

Share with the person sitting next to you.

Strategies

Strategy	Explanation	Example	Effect size
Organising and transforming	Overt or covert rearrangement of instructional materials	Making an outline before writing an essay; summarising and restating for others	0.85

Strategies

Strategy	Explanation	Example	Effect size
Self-consequences	Student arrangement or imagination of reward for success	Deferred gratification	0.70

Strategies

Strategy	Explanation	Example	Effect size
Self-instruction	Self-verbalising the steps to complete a given task	Verbalising steps in solving a maths problem	0.62

Strategies

Strategy	Explanation	Example	Effect size
Self-evaluation	Setting standards and then using them for self-judgement	Checking work against rubric before handing in	0.62

Strategies

- ▶ “Exam wrappers”
 - ▶ Asking students to reflect, before and after an exam or test, on study habits, time spent on topics, deliberate practice, etc.

Music Technology

Advanced Subsidiary Unit 2: Listening and Analysing

Monday 16 May 2011 – Morning
Time: 1 hour 45 minutes

Paper Reference
6MT02/01

You must have:
Individual CD player, headphones and
audio CD of recorded extracts.

Total Marks

Instructions

- Use black ink or ball-point pen.
- Fill in the boxes at the top of this page with your name, centre number and candidate number.
- Answer all questions.
- Answer the questions in the spaces provided
– there may be more space than you need.
- If you are using a computer to play the CD, access to sequencing software is NOT permitted.
- You must ensure that the left and right earpieces of your headphones are worn correctly.
- You must write in continuous prose in Questions 5(f) and 6(g).

Information

- The total mark for this paper is 80.
- The marks for each question are shown in brackets
– use this as a guide as to how much time to spend on each question.
- Questions labelled with an asterisk (*) are ones where the quality of your written communication will be assessed
– you should take particular care with your spelling, punctuation, grammar and clarity of expression on these questions.
- Each question number refers to the relevant track number on the audio CD, eg Question 1 refers to Track 1, Question 2 to Track 2 etc.
- You may listen to each track as many times as you wish within the overall time limit of the paper.
- The use of the words 'instrument' or 'sounds' refers to vocals, acoustic instruments, electric/electronic instruments and electronically-generated sounds unless otherwise stated.

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Go or I
dare you!

So it's worth
planning these
responses; you
have time.

! HEADPHONES
must be on the
right way round!

– do I need to
listen to the whole
track?

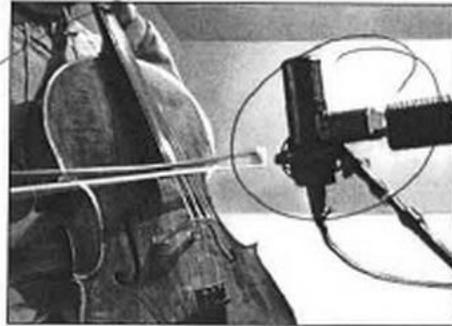
READ THE QUESTION

Turn over ▶

(RTFQ)



(e) The Cello features heavily in the texture of this recording. Look at the picture below and describe the **choice** of mic, the **distance** and the intended **result** of this setup.



Mic has to be
condenser?

Why?

close
mic.

What's the
point of
close mic'ing
something?

	Description	Result
Choice of mic.	(1)	(1)
Distance	(1)	(1)

[Total for Question 2 = 10 marks]

Easy!
4 marks

Strategies

- ▶ Reciprocal teaching
 - ▶ Questioning
 - ▶ Clarifying
 - ▶ Summarising
 - ▶ Predicting

<https://www.youtube.com/watch?v=My68SDGeTHI>

Metacognitive Talk - teachers

What could you do if you have problems?

How do you know that?

Will this way make it easier?

Check what you are counting in or the unit of measure.

I don't understand it either, so let's have a look together.

Metacognitive Talk - students

I know what
to do.
Oh, I love
hard work.

Something
is missing.

Hmm, I'm
not sure
that's
right.

Did you
mean...?

We need to know
which way to go
round the table.
We should talk about
it together.

I think this one
is correct, but
I'm not sure
about this one.

I think we're
nearly there.

Structure of Observed Learning Outcomes

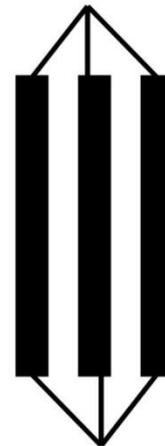
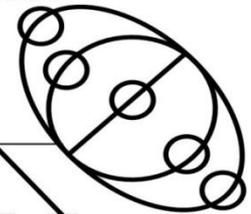
SOLO TAXONOMY
(after Biggs and Collis 1982)

Define
Identify
Do simple procedure

Define
Describe
List
Do algorithm
Combine

Compare/contrast
Explain causes
Sequence
Classify
Analyse
Part/whole
Relate
Analogy
Apply
Formulate questions

Evaluate
Theorise
Generalise
Predict
Create
Imagine
Hypothesise
Reflect



Prestructural

Unistructural

Multistructural

Relational

Extended abstract

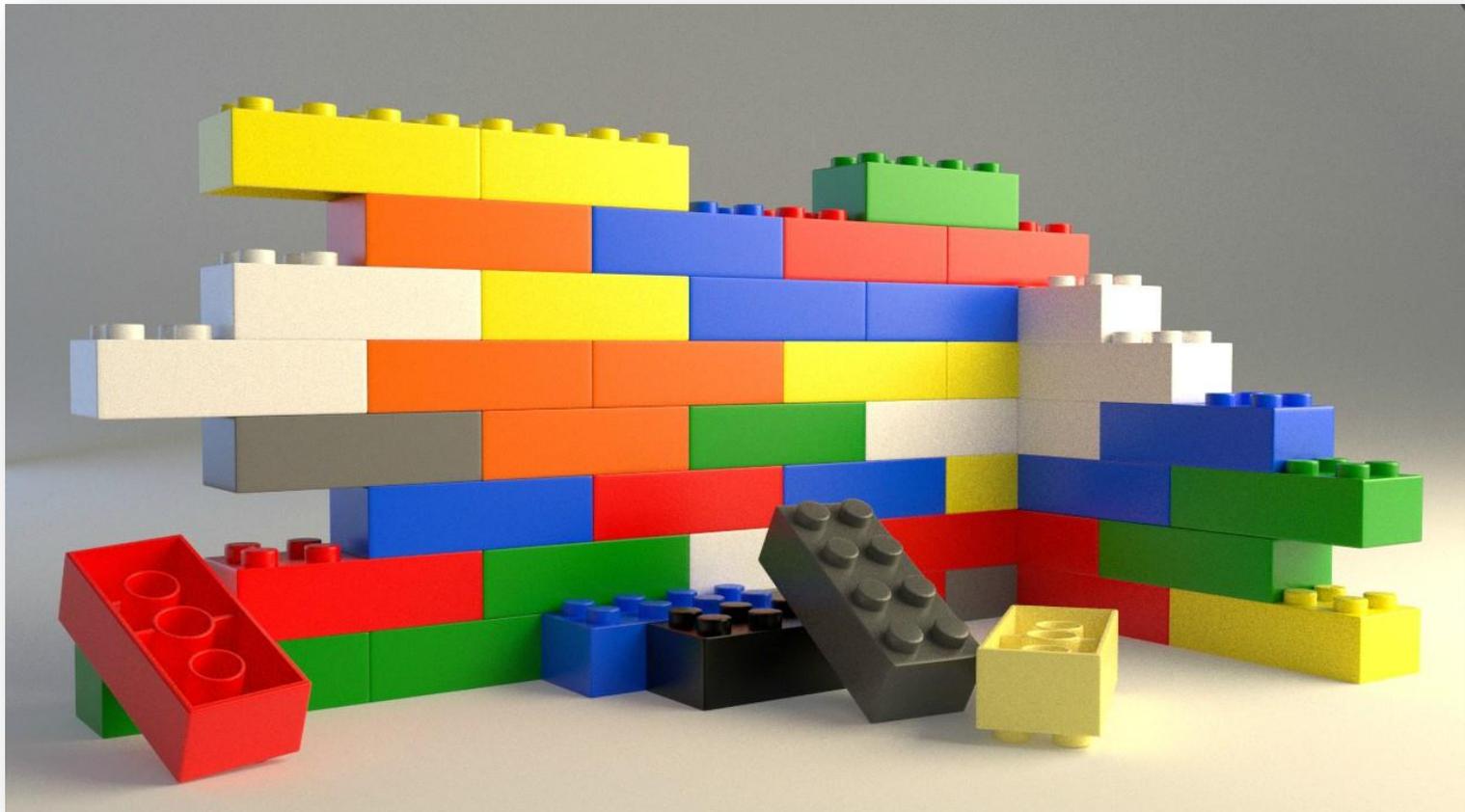
SOLO taxonomy - prestructural



SOLO taxonomy - unistructural



SOLO taxonomy - unistructural



SOLO taxonomy – multi-structural



SOLO taxonomy - relational



SOLO taxonomy – extended abstract



Structure of Observed Learning Outcomes

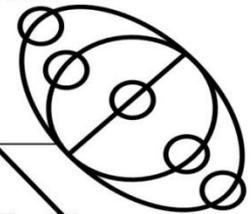
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Prestructural

Unistructural

Multistructural

Relational

Extended abstract

Metacognitive talk and formative assessment

Ice cubes are added to a glass of water. What happens to the level of the water as the ice cubes melt?

- A. The level of the water drops.
- B. The level of the water stays the same.
- C. The level of the water rises.
- D. More information is needed to be sure.

A metacognition checklist

- ▶ Planning - ask your students to identify their learning goals and to think about how they can meet their goals.
- ▶ Monitoring - ask your students to identify where the task could go wrong. How could they prevent this from happening? What can they do if they notice they have already gone off track?
- ▶ Evaluating – ask your students to consider their performance on the task. How could they improve their performance in future tasks?
- ▶ Practice and feedback - give your students the opportunity to use the new strategies both with support and independently. Have you given them feedback on their strategy use?
- ▶ Supportive classroom environment - think about how you can make the classroom environment more supportive of metacognitive practices. Are you modelling metacognitive practices through thinking aloud? Are you giving the learners plenty of opportunity to work collaboratively with their peers, reflect on their learning, and evaluate their progress?

Next steps

- ▶ Begin with one domain area, such as reading, and think about what metacognitive strategies will be helpful to your students (e.g., predicting, questioning). Ask them some of the problems they face when reading. How can you help them to think about their own reading more explicitly?
- ▶ Model the strategies through thinking aloud (metacognitive talk). Encourage your students to think aloud with their peers.
- ▶ Choose the next area of focus (e.g. maths problem solving). Are there any strategies from the previous domain of learning that can be transferred to this area? What new strategies can be used?
- ▶ Be sure to give feedback on the different strategies students are using, encourage reflection on what does and does not work in particular situations.
- ▶ **Work together with other teachers in your school/department and share practice that promotes the development of metacognitive abilities in the classroom.**

Want to know more?

- ▶ Here's Professor Steve Higgins from Durham University talking about what metacognition is and how it can be used in the classroom.

<https://educationendowmentfoundation.org.uk/modals/video/132/>

- ▶ For a more in-depth look at metacognition, this podcast discusses the neural basis of metacognition, and how we measure and quantify it.

<https://www.youtube.com/watch?v=PzdopL2mGqo>

Want to know more?

- ▶ Listen to Dylan Wiliam talk about the importance of young people being able to reflect on their learning and how teachers can utilise these insights

<http://www.journeytoexcellence.org.uk/videos/expertspeakers/metacognitiondylanwiliam.asp>

- ▶ For more on the benefits of metacognition, visit the Education Endowment Foundation's [Teaching and Learning Toolkit](#) website which describes metacognition as having “high impact for very low cost, based on extensive evidence.”
- ▶ Explanation of effect sizes:
[https://educationendowmentfoundation.org.uk/uploads/pdf/Technical_Appendices_\(July_2012\).pdf](https://educationendowmentfoundation.org.uk/uploads/pdf/Technical_Appendices_(July_2012).pdf)

Want to know more?

Think Aloud:

<https://www.teachervision.com/skill-builder/problem-solving/48546.html>

SOLO and self-evaluation:

http://pamhook.com/mediawiki/images/d/dc/SOLO_Taxonomy,_Metacognition_and_HOT_Maps.pdf

Want to know more?

Websites

- ▶ OECD Insights: Debate the issues. Focus on metacognition
<http://oecdinsights.org/2014/10/28/want-to-improve-your-problem-solving-skills-try-metacognition/>
- ▶ Examples of both cognitive and metacognitive questions that can be used in the classroom <http://journal.media-culture.org.au/0605/11-leslie.php>
- ▶ Education Endowment Foundation: Teaching and Learning Toolkit on metacognition <https://educationendowmentfoundation.org.uk/toolkit/toolkit-a-z/meta-cognitive-and-self-regulation-strategies/>
- ▶ Thinking Together Project. A dialogue-based approach to the development of children's thinking and learning. <http://thinkingtogether.educ.cam.ac.uk>

Want to know more?

Books

- ▶ Hattie, J. (2009) *Visible Learning: A Synthesis of Over 800 Meta-Analyses Relating to Achievement*. Abingdon, UK: Routledge
- ▶ Larkin, S. (2009). *Metacognition in young children*. London, UK: Routledge.
- ▶ Whitebread, D. & Pino Pasternak, D. (2010) *Metacognition, self-regulation & meta-knowing*. In Littleton, K., Wood, C. & Kleine Staarman, J. (eds) *International Handbook of Psychology in Education*. Bingley, UK: Emerald.
- ▶ Brown, A. L. (1987). *Metacognition, executive control, self-regulation and other more mysterious mechanisms*. In F. E. Weinert, & R. H. Kluwe (Eds.), *Metacognition, motivation and understanding* (pp. 65–116). Hillsdale, NJ: Erlbaum.
- ▶ Kolencik P L and Hillwig S A (2011) *Encouraging Metacognition – Supporting Learners Through Metacognitive Teaching Strategies*. Peter Lang, New York.

Reflection

- ▶ Connect?
- ▶ Extend?
- ▶ Challenge?

- ▶ Summarise and transform...



Reflection

Reflective as learners, developing their ability to learn.

Cambridge learners understand themselves as learners. They are concerned with the processes as well as the products of their learning and develop the awareness and strategies to be lifelong learners.





Thank you



Learn more!

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