



Intellectual Output 1:
State of the Art: Pre-Research
With a Summary in English and German

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vidumath - creative video for mathematics - VG-SPS-BE-15-24-013795

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Collection of Related Work

The vidumath project operates within a wider framework of video education and mathematics learning. Its themes are:

- a) The use of videos in education
- b) Videos produced by children
- c) Videos used for experimenting with, demonstrating, and understanding mathematics.

A broad variety of existing research in all three fields was located, albeit much less that deal with a combination of the three themes.

The compilation of related work includes works on:

- Media education
- Mathematics learning issues and how to overcome them
- Visual learning
- Overall approaches within ICT learning
- Ethical and practical issues for video learning
- Pedagogical concerns of how to foster learning with new technologies.

The table titled “The 20 Most Relevant Academic Papers” (see appendix) is a shortlist of works that the project considers to be most importance for vidumath. Further material (see the table in the appendix) includes not only literature but also websites, social media, software, and games. Particular games support the acquisition of concepts and provide fresh pedagogical approaches.

A compilation of a shortlist of 20 videos was also collated(see appendix). These present a colourful selection of what can be done with video and mathematics learning and includes different video production approaches, age groups and content. The material includes ideas ranging from turning an algorithm into a dance to stop-motion videos about symmetry. The production style ranges from simple one-shot videos (where no editing is required) to “proper” video production where material is carefully recorded and post-produced.

The videos fit well within the vidumath matrix to offer video mathematics ideas within entry, intermediate, and creative explorations. This can help teachers to identify more easily what might be possible without overstressing their resources and experience. The videos also show to what degree video production can be creative. Material includes still images, moving images and audio and also very different ideas of what can be recorded in front of the camera: students acting, objects moving, drawings and paintings, sounds and music.

Summary of the State of the Art

The VITALmaths project (Linneweber-Lammerskitten et al., 2014) comes close to the intention of vidumath, in that it focuses on innovative uses of videos in mathematics classes. Other work recommends practical activities with children in the sense of makerspaces (see Anfang et al., 2015), addresses theory-led experiments on innovative teaching (see Boaler, 2016), studies children's use of YouTube to create and share their own video content (Yarosh, 2016), or looks into how best to create visual explanations (see, e.g., LeFever, 2015). In the following, we summarize these works.

The goal of the Swiss/South-African project VITALmaths (Linneweber-Lammerskitten et al., 2014) is to use simple tools to let university students create videos for pupils that demonstrate mathematical procedures instead of just describing them. Every video is one to three minutes and shows a situation or a process and tries to re-enact, develop, generalize, transfer, prove, or question the problem instead of supporting a passive-receptive behaviour. They should not be instructive but rather motivating, activating cognition and providing orientation. Linneweber-Lammerskitten differentiates between weak, average, and talented learners and caters for the respective achievement goals with the help of mathematical video clips. The short films are silent, so that they can be viewed in class by each student at his or her own pace without disturbing other students. The videos need to be accompanied by material that enables spontaneous experimentation by pupils without immediate teacher support. Videos of unsuccessful attempts can be shown to encourage students and boost their self-confidence. A major difference between VITALmaths and vidumath is that vidumath videos are being produced by the children themselves and not by university students.

Anfang, Demmler, Lutz and Struckmeyer (2015) give examples of effective media education and activities for children of aged two to twelve. As those authors emphasize, children nowadays are living in an environment that includes versatile media. The authors present a broad collection of various practical concepts such as how to explore the environment with a digital camera, to collect noises, to animate films, do news reports, or learn with videogames such as Minecraft. It addresses anyone that wants to work with media pedagogically with children.

“YouthTube: Youth Video Authorship on YouTube and Vine” (Yarosh, 2016) is a content analysis study that analysed over 250 videos authored by children and adolescents. It explains the differences between the video platforms YouTube and Vine in terms of the age of the authors and the types of collaborations. Apparently there is a greater amount of violent, sexual, and obscene content on vine. In addition, there are differences in the approach to

sharing video: Whereas adults tend to use videos as an archive for their memories, teenagers rather use it as a stage to perform and present themselves.

Boaler (2016) refers to the definition of “mindset” by Carol Dweck: A mindset is a set of beliefs about one’s learning and potential. Dweck posits that individuals with a fixed mindset believe that smartness is fixed, whereas individuals with a growth mindset believe that anyone can learn everything, given they work enough. The brain operates differently when one believes in oneself and that struggle, challenges, and mistakes, grow the brain due to its plasticity. This attitude can change the way students perceive mistakes. Boaler states that there are no “maths people” or “gifted children” and that anyone can learn to high levels if they use the right way of teaching. She recommends that open-ended complex tasks should be provided with “a low entry point and a high ceiling” that are open to enable multiple methods, pathways, and representations. There shouldn’t be time pressure, because it just blocks working memory which is indispensable to deeply understand mathematical ideas and connections. Maths performance can be improved by adding visual components, asking students to reason with each other, and by attacking a problem before teaching the standard method to solve it. It is also important that children develop a number sense and learn that mathematics is not just about calculations and memorization but about thinking creatively and making connections.

LeFever (2015) is the founder of Common Craft videos. In “The Art of Explanation”, he addresses businesspeople, educators, influencers on how to improve explanations and how to present them. His theory is that good explanations affect the confidence of the audience. The challenge of the presenter is to maintain this self-confidence of the audience and not to destroy it with difficult explanations in a technical language just to feel smart him- or herself and to impress the audience with his knowledge. In addition to putting forward such fundamental considerations, LeFever offers much specific advice on effective visuals.

Recommendations for the vidumath Project

In the spirit of Boaler (2016) the most promising direction seems to be to *not* stick too closely to the standard mathematics curriculum (in contrast to many of the videos visible in the VITALmaths project mentioned above). Rather, vidumath should try and deal with topics and formats that do not closely resemble school book material (and may provoke the same mathematics anxiety), even though they target the same mathematical ideas, constructs, and competencies.

In the research phase we found a plethora of software tools and practical advice on filmmaking (see Table “Further Material”) that merit to be experimented on and potentially can be covered in the vidumath guidelines to be created. The creativity of the videos selected is very inspiring. The project would like to see that vidumath also develop into a project whose

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creativity sparks other project groups and inspires individual teachers. There is much video content available (and not mentioned in our selection here) that is subpar in terms of production and, even worse, in terms of didactics and creativity. We believe it is vital to bring across how exciting video maths projects can be.

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Acronyms Used in the Tables

Acronym	Vidumath Partner
32SOU	32 SOU "Sv. Kliment Ohridski" School, Bulgaria
DMMH	Queen Maud University College for Early Childhood Education, Norway
FHBI	FH Bielefeld (University of Applied Sciences), Germany
KIN	Kindersite Chester, UK
KUL	Kulturring Berlin, Germany
UC	University of Coimbra, Portugal

Acronym	Category
AC	Books, papers, theses
RE	Research projects
NA	Non-academic writings
WE	Web sites, groups, ...
VI	Videos
SO	Software (also web-based), apps, excluding games
G	Games
X	Everything else

The 20 Most Relevant Academic Papers

Contributor	Category	Reference	URL [Accessed: 23.08.2016]	Description	Language	Main contribution
KUL	AC	Anfang, G., Demmler K., Lutz, K. & Struckmeyer K. (2015). <i>wischen klicken klipfen: Medienarbeit mit Kindern</i> . München: kopaed	http://www.ciando.com/ebook/bid-1960879	Book on media education for age 2 to 12	German	Ideas and concepts for media pedagogical work with children and how a meaningful media education with kids between two and twelve years should be.
FHBI	AC	Boaler, J. (2016). <i>Mathematical Mindsets: Unleashing Students' Potential Through Creative Math, Inspiring Messages and Innovative Teaching</i> . San Francisco: Jossey-Bass.	http://eu.wiley.com/WileyCDA/WileyTitle/productCd-0470894520.html	How to turn the theory of the growth mindset into practical activities and math teaching strategies. How to get from self-doubt to self-confidence, turn mistakes and struggles into valuable learning experiences.	English	Proposes to overcome math anxiety by instilling a growth mindset in the students. Offers a large array of practical ideas for teaching.
DMMH	AC	Borko, H., Jacobs, J., Eiteljorg, E. & Pittman, M. E. (2008). Video as a tool for fostering productive discussions in mathematics professional development. In N. Gage (ed.), <i>Teaching and Teacher Education: An International Journal of Research and Studies</i> . Volume 24 Issue 2 (p. 417-436) Boulder: Elsevier.	http://www.science-direct.com/science/article/pii/S0742051X0600179X	The use of classroom video as a tool for fostering productive discussions about math teaching and learning in a professional development program.	English	Suggestions on how to use classroom video as a tool for fostering productive discussions about teaching and learning.

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DMMH	AC	Derry, S. J. (Ed.) (2007). <i>Guidelines for Video Research in Education: Recommendations from an Expert Panel</i> . Chicago: Data Research and Development Center.	http://drdc.uchicago.edu/what/video-research-guidelines.pdf	When and how can videos be used to produce data on learning in informal settings. How to produce and index video recordings and select segments of video recordings for analyses.	English	Examples of informed consent forms
FHBI	AC	Gallenbacher, J. (2007). <i>Abenteuer Informatik: IT zum Anfassen - von Routenplaner bis Online-Banking</i> . Heidelberg: Spektrum.	http://www.abenteuer-informatik.de/dasbuch.html	Simple explanations for the basics of computer science.	German	Information and experiments on computer science.
DMMH	AC	Goldman, R., Pea, R., Barron, B., & Derry, S. J. (2014). <i>Video Research in the Learning Sciences</i> . New York: Taylor & Francis.	http://www.tandeebooks.com/isbn/9780203877258	Key theoretical, methodological, and technological advances concerning uses of digital video-as-data in the learning sciences as a way of knowing about learning, teaching, and educational processes.	English	Help in video scholarship and supportive technologies.
DMMH	AC	Heath, C., Hindmarsh, J., & Luff, P. (2010). <i>Video in Qualitative Research</i> . London: Sage.	https://uk.sagepub.com/en-gb/eur/video-in-qualitative-research/book229882	Provides practical guidance for students and academics on how to use video in qualitative research, how to address problems and how to subject video recordings to detailed analysis.	English	Ethical and practical issues in recording and gathering data.

DMMH	AC	Jewitt, C. (2012). <i>An Introduction to Using Video for Research National Centre for Research Methods Working Paper</i> . London: Institute of Education.	http://eprints.ncrm.ac.uk/2259/4/NCRM_workingpaper_0312.pdf	The scope and use of video for data collection, the qualities and features of video as a research tool. Considerations that it raises for social research.	English	Information about using video as a research tool.
FHBI	AC	Lange, P. G. (2014). <i>Kids on YouTube: Technical Identities and Digital Literacies</i> . Walnut Creek: Left Coast Press.	http://www.lcoastpress.com/book.php?id=500	Long-term ethnographic studies on how children negotiate identity and develop digital literacy on YouTube. Peer-based and family-driven video-making dynamics, girl geeks, civic engagement, and representational ethics.	English	An ethnographic sociology of children and their parents as producers and consumers of videos. Covers in particular how children gain media literacy.
FHBI	AC	LeFever, Lee (2015). <i>The Art of Explanation: Are you ready to rethink how you communicate?</i> . Hoboken: John Wiley & Sons.	http://artofexplanation.com/	How to explain your ideas in business and education, by the founder of Common Craft.	English	Techniques for comprehensible and motivating explanations
DMMH	AC	Linneweber-Lammerskitten, H. (2009). Der Einsatz von Kurzfilmen als Einstieg in Experimentier- und Explorationsphasen. In M. Neubrand (Hrsg.), <i>Beiträge zum Mathematikunterricht</i> , Ausgabe 2009 (S. 743-746), Münster: Verlag für wissenschaftliche Texte und Medien.	http://www.vitalmaths.com/research	Fostering "research and explore" activities with short videos.	German	Ideas for the utilisation of short films as introduction in experimenting and exploration stages.

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DMMH	AC	Linneweber-Lammerskitten, H. (2011). VITALmaths: ein gemeinsames Forschungs- und Entwicklungsprojekt der Schweiz und Südafrika. In R. Haug & L. Holzäpfel (Hrsg.), <i>Beiträge zum Mathematikunterricht</i> , Ausgabe 2011 (S. 555-558), Münster: Verlag für wissenschaftliche Texte und Medien.	http://www.vitalmaths.com/research	Introduction of the VITALmaths project, that uses video clips as teaching tools.	German	Teaching, learning support and materials
DMMH	AC	Linneweber-Lammerskitten, H. (2014). Der Einsatz mathematischer Kurzfilme als Mittel der Binnendifferenzierung. In I. Bausch, G. Pinkernell & O. Schmitt (Hrsg.), <i>Unterrichtsentwicklung und Kompetenzorientierung: Festschrift für Regina Bruder</i> , Ausgabe 1 (S. 257-266), Münster: Verlag für wissenschaftliche Texte und Medien.	http://www.vitalmaths.com/research	Article about the assignment of mathematical short films to support individual learning processes.	German	Ideas how to individually support children with the help of educational short films
DMMH	AC	Linneweber-Lammerskitten, H., Schäfer, M. & Samson, D. (2013). VITALmaths Learning in Context: VITALmathsLIC. In G. Greefrath, F. Käpnick & M. Stein (Hrsg.). <i>Beiträge zum Mathematikunterricht</i> , Ausgabe 2013 (S. 620-623), Münster: Verlag für wissenschaftliche Texte und Medien.	http://www.vitalmaths.com/research	The learning process that the mobile use of short video clips on mathematics can support and enhance.	English	How learning can take place in different learning and contextual spaces. How to use worksheets and manipulatives.

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DMMH	AC	Linneweber-Lammerskitten, H., Schäfer, M., & Samson, D. (2010). Visual technology for the autonomous learning of mathematics. <i>Pythagoras: Journal of the Association for Mathematics Education of South Africa</i> , 72, 27-35	http://www.pythagoras.org.za/index.php/pythagoras/article/view/18	The efficacy and use of short video clips designed specifically for the autonomous learning of mathematics on mobile phones. Design, production and use of these video clips in South Africa and Switzerland.	English	Ideas and information about visual technology
KUL	AC	Ring, R. (2013). Stop-Motion-Technik im Mathematikunterricht: Lösungswege mit digitalen Medien veranschaulichen. In R. Rasch (Hrsg.), <i>Grundschulunterricht Mathematik</i> . 3/2013 (S.32-34). Berlin: Cornelsen Verlag GmbH.	http://www.oldenburg-klick.de/zeitschriften/grundschulunterricht-mathematik/2013-3/stop-motion-technik-im-mathematikunterricht	The use of stop motion in primary school.	German	Possible interesting contact for us https://www.tu-braunschweig.de/idm/mitarbeiter/wissmit/rink
DMMH	AC	Samson, D., Linneweber-Lammerskitten, H., & Schäfer, M. (2011). VITALmaths. In P. De Wet, <i>Learning and Teaching Mathematics</i> , special Issue 9 (p. 14-16). Centurion: Sabinet Online Limited.	http://www.vitalmaths.com/research	Publication about the VITALmaths project, that uses video clips as teaching tools.	English	Teaching, learning support and materials
FHBI	AC	Schön, S., Ebner, M. & Narr K. (2016). <i>Making-Aktivitäten mit Kindern und Jugendlichen: Handbuch zum kreativen digitalen Gestalten</i> . Nordersted: Books on Demand GmbH.	http://www.bimsev.de/n/?Freie_Lernmaterialien_Making-Aktivitaeten_mit_Kindern_und_Jugendlichen_Handbuch_zum_kreativen_digitalen_Gestalten	Manual on project ideas for makerspace-like activities with children.	German	Techniques and ideas for makerspace-like activities.

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DMMH	AC	Seago, N. (2003). Using video as an object of inquiry for mathematics teaching and learning. In J. Brophy (ed.), <i>Using Video in Teacher Education: Advances in Research on Teaching, Volume 10</i> (p. 259-286). Bingley: Emerald Group Publishing Limited.	http://www.emeraldinsight.com/doi/abs/10.1016/S1479-3687%2803%2910010-7	An attempt to create a professional development curriculum using video to help teachers improve mathematics teaching and learning.	English	Principles, lessons learned, and needs for more research.
FHBI	AC	Yarosh, S., Bonsignore, E., McRoberts, S. & Peyton, T. (2016). YouthTube: Youth Video Authorship on YouTube and Vine. In D. Gergle & M. R. Morris (ed.), <i>Proceedings of the 19th ACM Conference on Computer-Supported Cooperative Work & Social Computing</i> , Issue 1 (p.1423-1437). New York: Association for Computing Machinery.	http://lanayarosh.com/wp-content/uploads/2015/11/cscw-2016-youthtube.pdf	Ethnographic study on children's use of YouTube as a publication medium.	English	Differences between adults and teenagers in sharing and creating video content on social platforms.

The 20 Most Relevant Videos

Contributor	Category	Reference	URL [Accessed: 23.08.2016]	Description	Language	Main contribution
KUL	VI	AlgoRythmics: Quick-sort dance	https://www.youtube.com/watch?v=ywWBy6J5qz8	A choreography that demonstrates a sorting algorithm.	English	Example of a creative video that is presenting a sorting algorithm
DMMH	VI	Christian Sandum Pedersen: Five small monkeys	https://youtu.be/z6NSblg8YPs	Video made by preschool teacher students about counting, a Norwegian number song.	Norwegian	Video example about counting using a song
KUL	VI	DorFuchs: Math on vacation!?	https://www.youtube.com/watch?v=nmTq7MvYLE4	Math turned into a rap song. Proportionality and units.	German	Video example for mathematics in everyday life presented in form of a song
KUL	VI	j0190: Math with the stop motion technique	https://www.youtube.com/watch?v=p9bEW4MQDqE	Solving a problem from algebra with stop motion.	German	Example for stop-motion about algebra
KUL	VI	Katie Steckles: Mathematical present wrapping	https://www.youtube.com/watch?v=NwmHHLdDBSA	The geometry of paper and boxes. Very few cuts.	English	Educational Video example about wrapping, that teaches geometry.
32SOU	VI	Knowledge Channel: Multiplication of mixed forms by a fraction	https://www.youtube.com/watch?v=ah2F0OyGXT4	Explanation with graphics, plus acting sequences.	English	Example for a video lesson in form of a role play
DMMH	VI	Linnemath: A quarter plus a third	https://youtu.be/xMskzrWcE0U	A model of a rectangle is used to visualise the sum of two fractions.	English	Example for stop motion.
DMMH	VI	Linnemath: What's in the box? #1	https://youtu.be/tXSTOyUED-A	Matches and matchboxes of various colours are used to model the concept of variable.	German	Example for stop motion.

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DMMH	VI	Linnemath: What's in the box? #2	https://youtu.be/pwyH9r2sFQs	Solving simultaneous equations through a process of logical reasoning without the introduction of algebra.	German	Example for stop motion.
DMMH	VI	Linnemath: What's in the box? #3	https://youtu.be/Gvw3AMyB-To	Building on from previous "What's in the box?" clips, variables are introduced to represent unknown quantities.	German	Example for stop motion.
32SOU	VI	MathTV: Video lessons by teachers	http://www.mathtv.com/	Khan-style-like but very brief presentations on basic and more advanced math.	English	Video lesson examples
KUL	VI	mediaeducation.net: Camera tutorial	https://www.youtube.com/watch?v=-KpMhH3jjeo	A general tutorial produced by Kulturring on how to use the camera in different ways.	German	filming tutorial
KUL	VI	mediaeducation.net: vidusign stop motion tutorial	https://www.youtube.com/watch?v=hEUjAxIZtpU	Video tutorial to create stop motion videos	German	The vidusign stop motion tutorial as a model of techniques that can be applied in vidumath.
KUL	VI	swampieandgreenie: Rotational symmetry	https://www.youtube.com/watch?v=ARq9JhwSmDo	A good example of what you can do with a one shot: no editing.	English	One-Shot-Video example about symmetry
DMMH	VI	Thor Gjermund Eriksen: Kosinus. Episode 9:19	https://tv.nrk.no/serie/kosinus/DMPV76000813/sesong-4/episode-9	Film for children about fractions made by the Norwegian Broadcasting Company NRK.	Norwegian	Film example about mathematics made by children
32SOU	VI	Turtlediary.com: Math videos for second grade	http://www.turtlediary.com/videos/second-grade/math.html	Khan-style-like explanations, but not hand-drawn.	English	Video lesson examples

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DMMH	VI	VITALmaths: A third minus a fifth	https://youtu.be/BfP4GQ2JoLE	A visual approach is used for the subtraction of a smaller fraction from a larger one.	English	Example for stop motion.
DMMH	VI	VITALmaths: A third plus a quarter	https://youtu.be/sVnvyQdl6js	A visual approach is used for the subtraction of a smaller fraction from a larger one.	English	Example for stop motion.
DMMH	VI	VITALmaths: Hubcap geometry	https://youtu.be/rAr7q2ZalQ	Hubcaps are investigated in terms of their rotational and reflectional symmetry.	English	Short-film example about symmetry in everyday life
KUL	VI	Τα Μαθηματικά είναι το πρόσχημα: Symmetry	https://www.youtube.com/watch?v=gY2A51ZS4dc	Very artful but low-budget stop motion production.	Greek	Example for stop-motion

Further Material

Contributor	Category	Reference	URL [Accessed: 23.08.2016]	Description	Language	Main contribution
DMMH	AC	Linneweber-Lammerskitten, H. (2011). Der Lernstick als Hilfe zur Binnendifferenzierung im Mathematikunterricht. In H.-U. Grunder (Hrsg.), <i>mLearning in der Schule: Der Lernstick als Lerninstrument</i> . Ausgabe 1 (S. 75-84). Baltmannsweiler: Schneider Verlag Hohengehren.	http://www.vitalmaths.com/research	mathematical and didactical project that uses private storage sticks during lessons	German	Ideas about using a private storage medium during math lessons
KIN	G	Arcademics (2016): Tractor multiplication	http://www.arcademics.com/games/tractor-multiplication/tractor-multiplication.html	Multiplication game	English	Example for educational math games
KIN	G	Bart Bonte	http://www.bartbonte.com/	Logic games for mobile devices	English	Example for educational games
KIN	G	Colin Northway: Fantastic contraption	http://fantasticcontraption.com/original/	Online physics puzzle game	English	Example for educational games
KIN	G	Intel Education Maths	http://inteleducationresources.intel.co.uk/primary_maths.aspx	Curricular support	English	Useful resources for interactive math lessons
KIN	G	Joel Gaspard: Toy Theatre	http://www.toytheater.com/math.php	Collection of math games	English	Examples for educational math games

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FHBI	G	Mojang Synergies AB: Minecraft	https://minecraft.net/	Minecraft is a game about breaking and placing blocks. But players can also work together to create wonderful, imaginative things.	many	Highly popular virtual lego bricks; could be used for machinima-style videos
KIN	G	Peter Lee: Math lines	http://www.novelgames.com/en/mathlines/	Counting game	English	Example for educational math games
KIN	G	Peter Lee: Number balls	http://www.novelgames.com/en/numberballs/	Number game	English	Example for educational math games
32SOU	G	prongo.com Inc.: prongo-games	http://www.prongo.com/	Prongo is an educational website, which offers fun, interactive and educational games.	English	Examples for educational games
KUL	RE	Christoph Selter (TU Dortmund): Pik AS maths project Germany	http://pikas.dzlm.de/index.html	The project PIK AS acquires materials to refine math class in the primary stage.	German	Possibility for us to connect - developing materials to develop maths learning
DMMH	RE	University of Applied Sciences Northwestern Switzerland & Rhodes University in South Africa: VITALmaths	http://www.vitalmaths.com/	A Swiss university of applied sciences and a university in South Africa research into short video clips specifically designed for autonomous learning in mathematics that make use of natural materials to animate and develop a variety of concepts and processes.	English, German	Ideas for short video clips designed for the autonomous learning of mathematics

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FHBI	SO	Heber Sheffield & Lance Harris: Puppet Pals	http://www.polishedplay.com/apps/puppet-pals-2.html	Puppet Pals is an App to create animated movies on a mobile device.	English	Creative movie making tool
FHBI	SO	International GeoGebra Institute: GeoGebra	http://www.geogebra.org/	Free mathematics software for learning and teaching. Interactive graphics, algebra, spreadsheets and free learning materials from elementary school to university level.	many	Tool to make mathematics tangible
32SOU	SO	Kevin Stone: Brain Bashers	http://www.brainbashers.com/	Includes an interesting collection of math, logic, and language puzzles, games, and illusions, separated into easy, medium and hard categories.	English	Examples for educational games
FHBI	SO	Ralph Damiano: Stick Nodes - Stickman Animator	https://itunes.apple.com/us/app/stick-nodes-stickman-animator/id932127902?mt=8	Stick Nodes is a powerful stick figure animation program which allows users to create their own animated .gifs on mobile devices.	English	Extraordinarily simple creation of animations
FHBI	SO	Sparkol Limited: VideoScribe	http://www.videoscribe.co/	Animated clipart and simulated writing/drawing hand for Khan-style videos	English	Tool for making whiteboard style animation videos
FHBI	SO	University of Bayreuth: Sketchometry	http://sketchometry.org/	sketchometry can convert your hand drawings into geometric constructions, which can be modified and dragged around.	German, English	Tool to convert hand drawings into geometric constructions which can be useful in geometry lessons.

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FHBI	WE	Alexander Altendorfer e.U.: Stop-Motion Tutorials	http://www.stopmotiontutorials.com/	A range of stop motion tutorials for beginners and experts.	German	Examples for stop motion
KIN	WE	Andrei Radulescu-Banu, Stefan de Kok, Mihai Ionescu & Marina Shalmon: LinkedIn The Math Connection	https://www.linkedin.com/groups/1872005/profile	Social networking group	English	Information about teaching mathematics and social interaction with other people to gain ideas and data.
32SOU	WE	Asia Citro: 50+Creative Math Activities for Kids	http://www.funathomewithkids.com/2015/03/quest-post-50-creative-math-activities.html	Collection of creative math activities for kids	English	Ideas on using a wide range of simple props for experiments and demonstrations in math
32SOU	WE	Borough of Telford & Wrekin: Mathematics resources	http://www.taw.org.uk/demo/mathematics/	Resource modules	English	digital mathematics resources
KIN	WE	Catharine Alvarez: Facebook Math Wizard	https://www.facebook.com/groups/the-mathwizard/	Social networking group	English	Information about teaching mathematics and social interaction with other people to gain ideas and data.
32SOU	WE	Cilenia: Math exercises	http://math.cilenia.com/bg	interactive math exercises	many	Example for interactive math exercises
32SOU	WE	Coolmath.com LLC: Cool math 4 kids	http://www.coolmath4kids.com/	An amusement park of maths games and activities.	English	Examples for educational games
KIN	WE	Dean McGee, Eric Tramel, Anna Ruhs and others: Google+ STEM Educators	https://plus.google.com/communities/112904336188381403474	Social networking group	English	Information about teaching mathematics and social interaction with other people to gain ideas and data.
KIN	WE	Dennis Kostac: LinkedIn Common Core State Standards - Mathematics	https://www.linkedin.com/groups/4204066/profile	Social networking group	English	Information about teaching mathematics and social interaction with other people to gain ideas and data.

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KUL	WE	Eduversum GmbH: Medienkompetenzprojekte in Deutschland	http://www.lehrer-online.de/film.php	German website about integrating productive work with a video camera in school lessons and projects.	German	Background information for German teachers
KIN	WE	Rossana: Facebook Math images	https://www.facebook.com/colorsgeom	Social networking group	English	Information about teaching mathematics and social interaction with other people to gain ideas and data.
KUL	WE	Deutsches Institut für Internationale Pädagogische Forschung: Fachportal Pädagogik - Referenzen Video (pedagogy portal, references on video)	http://fachportal-paedagogik.de/fis_bildung/fis_list.html?&ckd=yes&mtz=50&facets=y&maxg=5&ohneSynonyme=y&sort=jahrAb&felldname1=Schlagw%F6rter&feldinhalt1=VIDEO&bool1=or&nHits=2385	Overview of resources in the area of math and video with a focus on video consumption rather than production by children.	German	Overview of resources
32SOU	WE	Fila, LLC: Math Game Time	http://www.mathgame.com/	Math Game Time provides visitors with a great selection of fun online math games worksheets and videos for Pre-Kindergarden to 7th Grade students.	English	Example for educational games
KIN	WE	Jane Seemann & Bel Jensen: Facebook STEM Teaching Ideas	https://www.facebook.com/groups/996547003735577	Social networking group	English	Information about teaching mathematics and social interaction with other people to gain ideas and data.

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32SOU	WE	Johnnie's Math Page: Fun math for kids	http://jmathpage.com/index.html	Over one-thousand math learning and teaching resources have been categorized and set out for you.	English	Math learning and teaching resources
KIN	WE	Kennedy Musenga, Mwila Fumpa and others: Facebook MATHEMATICS ONLY	https://www.facebook.com/groups/1404326146475054	Social networking group	English	Information about teaching mathematics and social interaction with other people to gain ideas and data.
32SOU	WE	Krimsten Publishing: Multiplication games	http://www.multiplication.com/	Multiplication techniques, tips, and secrets used by master teachers.	English	Examples for educational games
KIN	WE	Manny Lorenzo: Facebook Math+Art	https://www.facebook.com/groups/1426296177668017/	Social networking group	English	Information about teaching mathematics and social interaction with other people to gain ideas and data.
KIN	WE	Michael Weiss & Josh Hertel: Facebook Mathematics Education Research	https://www.facebook.com/groups/mathedresearchers/	Social networking group	English	Information about teaching mathematics and social interaction with other people to gain ideas and data.
FHBI	WE	Brendon Grunewald: Moovly	https://www.moovly.com/	Professional Free Online Video Animation Software and Video Maker.	English	Tool to animate videos and presentations
KIN	WE	Opher Liba, Marie Joubert & Rebecca Hanson: LinkedIn Math, Math Education, Math Culture	https://www.linkedin.com/groups/33207/profile	Social networking group	English	Information about teaching mathematics and social interaction with other people to gain ideas and data.

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KIN	WE	Prashant Joshi: LinkedIn Science Math Primary/Secondary Education	https://www.linkedin.com/groups/69765/profile	Social networking group	English	Information about teaching mathematics and social interaction with other people to gain ideas and data.
KIN	WE	Rakiya Chester: Facebook Math Problem Solving	https://www.facebook.com/mathproblemsolving	Social networking group	English	Information about teaching mathematics and social interaction with other people to gain ideas and data.
KIN	WE	Roberto Natalini: Facebook MaddMaths!	https://www.facebook.com/groups/maddmaths	Social networking group	Italian, English, Others	Information about teaching mathematics and social interaction with other people to gain ideas and data.
KIN	WE	Ronald Buelow: Google+ Mathematics	https://plus.google.com/collection/0q1AQ	Social networking group		Information about teaching mathematics and social interaction with other people to gain ideas and data.
32SOU	WE	Sandbox Networks, Inc.: Math games from Funbrain	http://www.funbrain.com/brain/MathBrain/MathBrain.html	Funbrain is a website that offers free educational games, online books and comics.	English	Example for educational games
FHBI	WE	Sandra Schön & Martin Ebner: "Making" - Kreatives digitales Gestalten mit Kindern	http://imoox.at/wbtmaster/startseite/maker.html	"Making" is an open online course (MOOC) for creative digital design and experiments with children.	mostly German	Information about creative digital design and experiments

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FHBI	WE	Stanford University: Youcubed	https://www.youcubed.org/	Youcubed has the main goal is to inspire, educate and empower teachers of mathematics, transforming the latest research on math learning into accessible and practical forms.	English	Information about the latest research on math learning
FHBI	WE	STEM Learning Ltd.	https://www.stem.org.uk/resources	Website with STEM related programmes and projects designed to have a positive impact on participants. All activities are grounded in appropriate education and scientific research supported by clear evidence of impact.	English	Information about STEM related programmes and projects
KIN	WE	STEMschool.com: Facebook STEM Education	https://www.facebook.com/STEMSchools	Social networking group	English	Information about teaching mathematics and social interaction with other people to gain ideas and data.
32SOU	WE	The Math Forum at NCTM: Ask Dr Math	http://mathforum.org/dr.math/	A forum to ask Dr Math any maths question and search for answers.	English	Example for a forum to learn math together
FHBI	WE	University of Canterbury: CS unplugged - Computer Science without a computer	http://csunplugged.org/	Paper-and-pencil activities for children to get insights into foundational ideas of computer science.	many	Examples for paper-and-pencil activities to teach computer science

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32SOU	WE	Wendy A. Petti: Math cats	http://www.mathcats.com/index.html#contents	Join the Math Cats is a website with creative, open-ended math explorations, games and riddles.	English	Examples for educational games and riddles
FHBI	X	LEGO Group: Lego MoreToMath	https://education.lego.com/en-us/elementary/show/moretomath	LEGO Education MoreToMath includes guided lessons, student worksheets, assessment and helps teachers make abstract math tangible.	many	Concept to make math tangible using LEGO bricks and software
KIN	X	National Center for Education Statistics: Kids zone- create a graph	http://nces.ed.gov/nceskids/createagraph/default.aspx	Visualising graphs	English	Example for a tool for kids to easily create graphs

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