

To Vereniging Onderwijs Research (VOR) and directors of institutes for *training of teachers* (Teacher Education) at different universities in The Netherlands
cc Executive board NVvW and chair KWG

Concerning: Mathematics education (ME) research (MER) versus general education research and training of teachers, in relation to my letter to NRO / PROO
<http://thomascool.eu/Papers/Math/2016-04-15-Letter-to-NRO.pdf>

May 9 2016

Dear professor Volman (chair VOR) and others,

Allow me to introduce myself as an econometrician (also qualified for teaching economics) (Groningen 1982) and teacher of mathematics (Leiden 2008).

My objective in this letter is to present a **paradigm shift** (page 10) that **also** implies the need for **action** by boards and directors.

Thomas S. Kuhn introduced the notion of paradigm (in various meanings) and argued that it may require a long time before one paradigm is replaced by another, like in evolution. A conceivable reaction by you thus is that paradigm shifts better be discussed in the journals, and that conclusions will gradually percolate into governance. However, what I present to you **is so clear** that the latter road is unwise, and it is proper to call for governance directly.

Governance is already required w.r.t. information management. You are **fundamentally and structurally disinformed** by the present community of mathematics education (ME) and its research (MER). In 2008-2015 I tried to discuss this paradigm shift mainly within the realm of ME and MER themselves. Given the lack of success, and actually larger morass, **stakeholders** better step in. Given your state of disinformation: what is clear may still require some pages and hours of study. It will require an organised effort for retraining of members VOR including yourself, and to bring about proper research with integrity of science.

This letter is not only an **adequate response** to the situation and a **proper request** to you, but it also offers the prospect of an **international** advance of research.

A pillar for this letter is A.D. de Groot (1982), *Academie en Forum*, Boom. Let me invite you to do your best to get this available as free pdf and paid P.O.D., also in English translation. In Dutch there is also the free pdf by De Groot & Visser (2003) but this must be translated into English too: <https://www.knaw.nl/nl/actueel/publicaties/het-forumwaarmerk-van-wetenschap>.

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(1) Prolegomenon: what a paradigm shift means

Let me first give an example of a paradigm shift mentioned by Alwyn Olivier (1989).

Researchers will know what a paradigm shift means, but it is useful to be reminded of it.

<http://academic.sun.ac.za/mathed/malati/Misconceptions.htm>

QUOTE

Teachers are often wary of theory - they want something practical. Yet, as Dewey has said, "in the end, there is nothing as practical as a good theory." How come? Theory is like a lens through which one views the facts; it influences what one sees and what one does not see. "Facts" can only be interpreted in terms of some theory. Without an appropriate theory, one cannot even state what the "facts" are. Let me illustrate with a story, taken from Davis (1984).

It is said that in Italy in the 1640's, the water table had receded so far that a very deep well had to be sunk in order to reach water. This was done. Then pumps were fitted to the pipes, and...disaster!...no water poured out of the spigot. It was clear that something was wrong, but what? Their understanding of the situation, i.e. their theory of pumping water, was that it was

the pumps that pulled (sucked) the water to the surface. So the fault had to be with the pumps. New pumps were installed...better pumps were designed, built and installed...still no water. Then still better pumps, then even better ones. But the result was always the same: no water emerged from the spigot. They were baffled.

Finally, in 1643, Evangelista Torricelli, who invented the barometer, presented an alternative explanation (theory): It was not, he said, the pumps that pulled the water up. The pumps merely evacuated air from the pipes, creating unequal pressures at the two ends of the column of water, after which it was the atmospheric pressure that pushed the water up the pipes. This explained the difficulty: the air pressure is about 2,5 kg/cm, which is enough to support a column of water 10m high. It follows that if the water in a well is more than 10m deep, it cannot be pumped to the surface using atmospheric pumps. Building better and better atmospheric pumps would not resolve the issue - and that probably led to the invention of hydraulic pumps, which could do the job.

Let us again consider the role of theory. First, one cannot even discuss the matter without using some theory to explain the situation. Second, the objective fact that no water came out of the pumps, like the fact that a car refuses to start, does not lead anywhere. Unless you can say why there is no water, or why the car will not start, you are unable to do anything to change the situation. And in order to say why, you must interpret the "facts" in terms of an appropriate theory. Third, notice how the two different theories differed in their interpretation of the "facts" and suggested - prescribed! - different remedies to resolve the issue - one remedy was doomed, while the other offered some hope.

UNQUOTE

(2) Prolegomenon: special position of ME and MER

Let me subsequently establish that **mathematics education** has a **special role** for **pedagogy and education**. Let me restate from my letter to NRO (see above, page 1).

QUOTE

Mathematics education (ME) is crucial for education in general. The "two cultures" [metaphor] by C.P. Snow suggests a strong difference between alpha and beta worlds, but everyone would want that also alpha students can reason logically, have command of fundamental calculation, know some statistics, and such.

The core point is that mathematics has [a] **special position** in the development of rational thought and psychological self-image. This core point supports the notion of Bildung. Knowledge, skill and attitude w.r.t. mathematics are important for personal development and confidence of students.

Some curricula reduce mathematics to topics of space and number, and often there is reduction to test scores, with phenomena like "teaching to the test" and ["what you test is what you get"]. The proper notions w.r.t. above special position namely are difficult to implement and test. This rather implies that it is important to keep on emphasizing the special position, lest people forget. Admittedly mankind has found different ways to learn to think other than via the methods of what has become institutionalised as "mathematics" and I find the book "*Theory of Knowledge*" by Richard van de Lagemaat an excellent introduction for the international baccalaureat. Also there, however, mathematics is important.

It seems to me that no-one would want that education research would suffer from a **mis-state** w.r.t. scientific findings (Dutch "misstand", English common translation "abuse"). Let me request that you read the following review of the mis-state w.r.t. mathematics education (ME) and such research (MER).

<http://thomascool.eu/Papers/AardigeGetallen/2016-04-10-kern-misstanden.pdf>

UNQUOTE

(3) Prolegomenon: paper(s) / PS

In January 2016, I submitted this paper to *De Psycholoog*, which was rejected unfortunately. (A thought on the side: Perhaps it is time that psychology becomes a subject in high school, so that we also get teachers in it, and researchers in the education of psychology.)

<http://thomascool.eu/Papers/AardigeGetallen/2016-01-17-Meta-opmerkingen-over-psychologie-en-wiskunde.pdf>

Title: "Meta-opmerkingen over psychologie, wiskunde en onderwijs in wiskunde"

Summary: "Psychologie, wiskunde en onderwijs in wiskunde zijn innig met elkaar verbonden. Denken gaat via abstracties. Wiskunde kijkt op abstracte wijze naar patronen. Didactiek let op begrip en motivatie. Van Hiele niveau's van inzicht zijn epistemologisch en cognitief belangrijk, maar denkkelijk onbekend bij psychologen. De chaos rond de rekentoets toont een falend toetsingskader. Psychometristen die toetsen op wiskunde behoren kennis te hebben van didactiek van wiskunde. Forum Theorie van A.D. de Groot verdient veel meer aandacht."

In February 2016, I intended a paper for *Pedagogische Studiën* (PS), the journal of VOR, but it became too long, and references are still in the format of *Econometrica* rather than *Psychometrika*, whence it is no use to submit it. The editor indicated more drawbacks.

<http://thomascool.eu/Papers/AardigeGetallen/2016-02-10-Basisprobleem-in-pedagogie-onderwijs-en-didactiek-van-wiskunde.pdf>

Title: "Het basisprobleem in pedagogie, onderwijs en didactiek van wis- en rekenkunde: het onderscheid tussen de traditionele, "realistische" en (neo-) klassieke benaderingen"

Summary: "Pedagogie, onderwijs en didactiek zijn empirische zaken maar wiskundigen worden niet voor empirie opgeleid maar juist tot abstract denken. Zij kunnen zich ondeskundig gaan bemoeien wanneer wis- en rekenkunde in pedagogie, onderwijs en didactiek aan de orde komen. Veel zogenaamde "wiskunde" is historisch gegroeid over 5000 jaar vol verwaarlozen van didactiek. Bij "realistisch" of "traditioneel" rekenen speelt ideologie een grotere rol dan empirisch onderzoek. Wanneer zulke dwalingen worden verwijderd ontstaat klassieke wiskunde. Wanneer dit ook nog didactisch wordt verbeterd ontstaat neoklassieke wiskunde. Dit onderscheid is onvoldoende bekend in het onderzoek van pedagogie, onderwijs en didactiek. Wiskundigen verwaarlozen statistiek maar psychometristen kijken niet verder dan statistiek wanneer ook zij vergeten om van de onderwijspraktijk te leren. Bij het wis- en rekenonderwijs bestaat momenteel een experiment dat niet voldoet aan de protocollen van experimenteren op mensen. Dit experiment moet en kan worden stopgezet met een onderscheidende toets."

Part of my hesitation in submitting to PS is that the wise approach is: this letter on **governance** rather than discussion in the journals.

Part of my hesitation in rewriting and submitting to PS remains that PS is behind a pay-wall, except for one issue per year. Why write a paper and see it disappear behind a pay-wall? **My advice is to make PS open access**, so that e.g. teachers can read it who are not active in VOR. It should be simple to agree with universities that they pay for VOR and PS for their researchers in pedagogy and education, as part of the employment contract (i.e. for membership of a professional organisation, each to choose his or her own designation, to prevent a closed shop, but potentially VOR as a default choice).

Part of my hesitation in submitting to PS remains a conundrum w.r.t. the current structure of peer review in general. A researcher (also a teacher without a Ph.D. title) should be able to post a paper at an accessible place, so that peers can do their reviewing **ex post**. This makes for both quick circulation and connection with similar research. There can be version

management, when comments cause changes. A board of editors may pick cherries for further dissemination, but all involved know where all research can be found (a common database rather than "the internet"). The current structure has a review *ex ante*, which means that research is locked up and that the author may meet with editors who lack adequate background. This *ex ante* structure dates from the period when printing was expensive. The only reason to keep it nowadays is a problematic notion of 'reputation'. In practice this means that a board of editors of a journal aspires at being better than other journals and non-reviewed papers, while the notion of 'better' is begging the question for it involves the very same system of peer review. Hard working editors and reviewers should not take offence, for their work is appreciated. I only propose to think outside of the box.

The Fleischmann & Pons 1989 "report on cold fusion", as an example, causes scientists to be wary of too-easy dissemination of "results" to the general public. Scientists have a common interest in a good reputation for science itself. Bad apples taint the whole cart. However, examples like this "cold fusion" show that **openness** allows science to debunk nonsense. Without openness, there is more scope for bias and bigotry. In the 1960s, universities were places of opposition to a more conservative society. Conservative politicians have learned this lesson and have supported policies that reduce academic freedom, notably by introducing seemingly acceptable "economic" methods of "science management". The attitude is that one cannot trust scientists with the tax dollars, and that there must be systems of control to warrant output quality. As an economist I am much in favour of good economics, but I am also against false argumentation. The key issue is to find balance. De Groot (1982) discusses the situation 1960-1975 too, and I tend to agree with most, yet, he doesn't know about the current situation. The current situation is at odds with fundamental notions of science.

Let me refer to a column by Rosanne Hertenberger, and let me emphasize one phrase (check on Jeroen **Spandaw** below): <http://www.nrc.nl/handelsblad/2016/04/17/het-is-tijd-voor-een-elon-musk-van-de-wetenschap-1609245>

"De wetenschap is een buitengewoon chagerijnige wereld geworden, waar een verrassende hoeveelheid diep teleurgestelde, pessimistische en cynische mensen rondloopt. Misschien zijn er daarom niet zoveel boeken over. Begrijp me niet verkeerd, er zijn genoeg grote ideeën, bevlogenheid, brillen. Toch lijken de meeste mensen als kuddedieren vast te zitten in hetzelfde systeem. Een systeem waar iedereen continue wacht op goedkeuring. Goedkeuring van je ideeën, je plannen, je aanvragen, je referentiebrieven, je cv. Wetenschappers zijn loonslaven en flexwerkers ineen. Ze hebben niet de vrijheid van het ondernemen, maar ook nooit de zekerheid van een baan in loondienst. Telkens weer moet je bewijzen dat je je plek verdient, je genoeg stickers in je schriftje hebt behaald, door genoeg hoepels bent gesprongen, genoeg geld hebt binnengehaald. **Oh wee als iemand je voor gek verklaart.** Of neem het publicatieproces. Dat ingewikkelde spel dat we met elkaar spelen over waar we wat schrijven over onze ontdekkingen. Boek je een bijzonder resultaat of doe je een interessant experiment, dan schreeuw je dat niet van de daken, je gooit het niet online, op een blog of op Facebook of Twitter, zoals de rest van de wereld. Nee, eerst moet je steggelen met anonieme vakgenoten over wat je er wel en vooral niet over mag zeggen, en of het überhaupt bijzonder genoeg is om aan het publiek te vertonen. Soms gaat er een paar jaar overheen voor een bevinding aan de wereld wordt goopenbaard. En dan staat het nóg achter betaalmuren." (my emphasis)

PS also doesn't accept papers that have been "published elsewhere". Is putting a pre-print on the internet (website or database) "published" or does one intend peer review ?

(4) Prolegomenon: A.D. de Groot 1982

(A) As said above, A.D. de Groot (1982), *Academie en Forum*, Boom, is a pillar for this letter. Dutch people may be modest and think that English readers would not be interested in the first part of this book, on education research and education policy in Holland in the period 1945-1982, but it is informative on the Dutch situation, which is also relevant for English readers.

(B) I already referred to De Groot (1982) on p81 in Colignatus (1994), *Trias Politica & Centraal Planbureau*, Samuel van Houten Genootschap.
<http://thomascool.eu/Thomas/Nederlands/TPnCPB/Record/1994/11/30/TPenCPB.html>

De Groot (1982:9):

Misschien zou een moderne democratie niet met een *trias* maar met een *tetras politica* toegerust moeten worden, met als vierde onafhankelijke macht die van de wetenschap. Men zou kunnen denken aan een bijbehorende Hoge Raad, die in voorkomende ernstige gevallen de overheid kan veroordelen voor politieke prostitutie van onderzoek, voor misbruik van uitdrukkingen als “wetenschappelijk is aangetoond dat...” en voor wetenschappelijk onverantwoorde toepassingen. Het lijkt in principe een goed idee, althans – in de huidige situatie – een mooi luchtkasteel.

Based upon general principles of **Political Economy** ("Staathuishoudkunde"), I was already thinking in that direction, and De Groot's comment helped for the notion of an Economic Supreme Court (**ESC**), and then design a draft constitutional amendment for it. Later I discovered that economist Arthur Okun had made a similar comment, see my text in the RES Newsletter 2014: <http://www.res.org.uk/view/art7Oct14Features.html> The difference with De Groot is that I present this analysis within a strict framework for economic analysis, whence it is more than just a vague idea, and in fact it is a necessary step for democracy that doesn't want to rely on random events to attain full employment. The key design feature is that the ESC has a power within the policy making process: the option to veto the government budget if it contains incorrect information. <http://www.thomascool.eu/Papers/Drgtpe/Index.html>

The notion of separation of powers has been applied in more cases, and society already has some **myrias politica**. For Montesquieu however, we are dealing with Political Economy ("Staathuishoudkunde") whence the ESC: with a role in government policy making and a power (of veto). A local form is by Herman Philipse who suggested in 2008 that universities could be a *tetras politica*, but only when professors would have a say about their own research. <http://www.ublad.uu.nl/WebObjects/UOL.woa/4/wa/Ublad?id=1035389>

Education policy makers might opt for this idea too. There now is an advisory Education Council ("Onderwijsraad") – see (51) – that tries to balance results from research with governance practice, to attain advice that the minister of Education might adopt and defend in Parliament. It might happen – but I am no expert on this – that the minister defends a policy using claims about which researchers know that these misrepresent research findings or are plainly false. In that case no-one can stop the minister except the State Council ("Raad van State") or Parliament (informed by a free press) or later failure in execution. Parliament should however judge on policy goals, and not second-guess research. Hence, there is a good argument for an Education Supreme Court (EduSC) indeed, with the limited task of checking the quality of information which is used in education policy making. Potentially this is a sub-court of the ESC (that would look at the national budget in general).

Below, I will argue that mathematics education (ME) and its research (MER) require a **Simon Stevin Institute** (SSI).

(C) On the same page 9, De Groot explains that *methodology* has limits with respect to "objective criteria" and that practical implementation focuses on the behaviour by scientists. Subsequently, there is the need for **Forum Theory**.

Thus, attention w.r.t. *people* and *behaviour* is appropriate. (a) There is a tradition to only look at publications and disregard actions. (b) There is a new development to discuss behaviour only in terms of research integrity. (c) However, both are extremes, and there is a middle road, that allows for proper discussion on behaviour. The purpose of proper discussion of behaviour is to check whether the forum *functions* or not. Discussion of a particular scientist's actions are not necessarily critique *ad hominem*.

Die boodschap is dat wetenschapsontwikkeling en echte, waardevolle groei van onze kennis niet te garanderen noch te legitimeren zijn door het aanleggen van niet-menselijke, logische of methodologische criteria. Het gaat uiteindelijk namelijk om de kwaliteit van een cultuur die wetenschap mogelijk maakt. Die cultuur moet worden onderhouden, verbeterd en verdedigd door mensen; mensen die doordrongen zijn van de traditie van de wetenschappelijke houding, mensen die – voor een belangrijk deel stilzwijgend – overeengekomen zijn zich eerlijk te houden aan een stelsel van fundamentele, rationele gedragsregels: de regels van *het Forum*.

Die regels moeten worden geleerd; en dat is mede een zaak van de Academie. Maar, dat leren lukt alleen goed, als de leeromgeving van de onderzoeker dat leren niet belemmert maar bevordert. Daartoe is een democratisch staatsbestel nodig, maar niet voldoende. Voor een vruchtbare ontwikkeling van de politiek zo gevoelige gamma-wetenschappen in het bijzonder is tevens nodig: een overheid die haar voornaamste taak van wetenschapsbeleid goed verstaat; namelijk de taak om, ook op die wetenschapsgebieden, de traditie van kritisch onderzoek, rationele discussie en streven naar objectieve oordeelsvorming – kortom: de Forumcultuur – te steunen, te bevorderen, te beschermen.

De Groot describes Holland as having "an unusual degree of social cleavage", referring to political scientist Lijphart (p21). De Groot (1982:22) observes the Dutch "polder model". Again he mentions behaviour, in proper manner, focused on the proper functioning of the forum. The urge of each scientist to have one's own *territorium* better be controlled.

Het ziet ernaar uit dat er in Nederland een tendentie bestaat – sterker dan in de meeste andere landen – waardoor verschillen tussen groepen een ideologische lading krijgen, zó dat zij kunnen worden opgevat als 'principiële' verschilpunten; met als gevolg dat er een sociale structuur ontstaat bestaande uit een groot aantal afgescheiden, betrekkelijk onafhankelijke sub-establishments met eigen territoria en goed verdedigde grenzen ertussen. Enigszins in karikatuur beschreven is de consequentie van deze structuur dat over geen zaak van enig gewicht een nationale beslissing kan worden genomen indien bij de besluitvorming niet alle subgroepen, apart, vertegenwoordigd zijn. Dat betekent dat commissies en andere besluitvormingsgroepen bij ons de neiging vertonen om te groot, te omvangrijk te worden om nog te kunnen werken; en dit leidt er dan weer toe dat over veel fundamentele zaken geen werkelijke beslissingen worden genomen. Elders heb ik erop gewezen dat deze situatie zich, helaas, uitstekend leent tot een regeer-politiek van het type: Verdeel en heers.²

Remarkably (for an economist like me who worked at the Central Planning Bureau (CPB)), he concludes that Holland has a culture that makes planning difficult to achieve (p23). Unfortunately, creation of a **Simon Stevin Institute** (SSI) requires planning.

In andere woorden gezegd: onze geschiedenis heeft ons sterk gemaakt in de kunst van de coëxistentie, maar zwak in de vaardigheden van coöperatie, samenwerking – om maar te zwijgen van nationale planning en vernieuwing volgens plan. Maar nu ben ik al doende met de P van de

(D) De Groot (1982:16) explains that education research (34 years ago) was a young field (then 35 years old in Holland ?) and has the weaknesses of gamma science (cf. alpha and beta). I have limited knowledge about general education research, and can only hope that there is advance since 1982. However, see the discussion below on the "math war" between "realistic mathematics education" (RME) and "traditional mathematics education" (TME), that resulted in the still ongoing circus of the "rekentoets". Math teachers' association NVvW now proposes that other fields in highschool participate in improving calculation skills of students.

Schema 1: Kenmerken van de empirische onderwijskunde en van andere wetenschapsgebieden met soortgelijke moeilijkheden

De empirische onderwijskunde, gezien als de (sub-)discipline of het wetenschapsgebied waarin de onderwijsresearch (OR) thuis hoort, is:

- (1) een relatief 'jonge' wetenschap;
- (2) die zeer snel is gegroeid in aantal beoefenaars;
- (3) een wetenschap die zich pas sinds één of twee decennia op empirisch onderzoek heeft geworpen; en die dit heeft moeten doen:
- (4) zonder een stevige empirisch-wetenschappelijke traditie om op voort te bouwen;
- (5) zonder door de tijd beproefde procedures voor onderzoeksorganisatie, voor communicatie en samenwerking,
- (6) met weinig of geen geïnstitutionaliseerde contacten met (beoefenaars van) oudere vakken die langer met het bijltje van het wetenschappelijk onderzoek hebben gehakt,
- (7) met weinig coryfeeën van internationale allure, en
- (8) zonder een (of meer) duidelijk(e), aanvaard(e) paradigma(ta) in de zin van Kuhn;
- (9) een wetenschap waarin men er veel moeite mee heeft om, náást democratische besluitvormings- en overlegprocedures, óók de onmisbare hiërarchische structuren naar erkende competentie op te bouwen;
- (10) een wetenschap waarin de research-produktie wordt gekenmerkt door divergentie, óók qua uitgangspunten en basisbegrippen, en door een overmaat van 'kleingoed' zonder veel verband;
- (11) een wetenschap die een relatief lage status heeft, bij andere wetenschappen en bij het publiek,
- (12) alsmede, door dit alles, relatief weinig blijvende invloed, weinig effect op het maatschappelijk gebeuren.

Anders uitgedrukt: De 'kern' is week gebleven – pogingen tot versterking daarvan hebben weinig succes – de randgroei is daardoor grotendeels wildgroei gebleven – gebaseerd op hulpconstructies (modellen = wegwerptheorieën) – met een opbrengst van weinig stabiele waarde.

Alleen een enkel woord van toelichting is nodig op wat onderaan staat, achter 'Anders uitgedrukt'. Dit is gebaseerd op een bekende manier om 'harde' en 'zachte' wetenschapsgebieden te onderscheiden. Harde wetenschappen hebben een solide, stevige kern: een 'body of knowledge'.

(E) The issue of planning thus is important. A final quote from De Groot (1982:33):

Ontwikkelingslijnen in de Nederlandse onderwijsresearch

5. OR-externe organisatieproblemen

Hierbij gaat het voornamelijk om de politieke besluitvorming en met name om de ruimte die er aan OR wordt gegeven en het gebruik dat er van OR gemaakt wordt. Gaan wij ervan uit dat niet alleen door het beleid getroffen regelingen maar ook politiek-traditionele behandelingswijzen van onderwijsproblemen (en andere politieke gewoonten) kunnen worden veranderd dan is ook de vraag naar de best mogelijke besluitvorming en het best mogelijke gebruik van OR te zien als een organisatieprobleem, dat – misschien – kan worden opgelost. Dat lijkt een vruchtbaarder benadering dan ervan uit te gaan dat het nu eenmaal zo is, of toegaat.

Niettemin moet ik toegeven dat ik over de oplossing van dit probleem betrekkelijk pessimistisch ben. Op dit punt vooral maakt die voor Nederland zo traditionele ‘unusual degree of social cleavage’ het moeilijk te geloven in spoedige verbetering. Onze politieke besluitvormingsprocessen zijn niet berekend op de taken en de eisen van planmatige, op onderzoek gebaseerde, systematische innovatie. De structuren waarin wij hier leven – erger: de leefstructuren waaraan wij gehecht zijn geraakt – zijn veel beter geschikt voor voortgezette territoriumgevechten en coëxistentie (op zichzelf: een positieve kwaliteit) dan voor gerichte nationale planning, laat staan voor ‘concerted action’ volgens goede lange-termijnplannen.

Twee voorbeelden inzake die ‘ongeschiktheid’ voor nationale planning.

1. Op een vraag, na een lezing aan de Technische Hogeschool Twente van Benjamin Bloom over Mastery Learning, een vraag naar de kosten die gemoeid zijn met invoering van dit systeem – met name de kosten van onderzoek en ontwikkeling van specifieke curricula en leerpakketten, diagnostische toetsen, hulp- en steunmiddelen voor achterblijvers onderweg, etc. – antwoordde de spreker ongeveer als volgt: “Als je het systeem eenmaal hebt zijn de (exploitatie-)kosten relatief gering. De research- en ontwikkelingskosten zijn ongetwijfeld hoog – hoe hoog is moeilijk te schatten – maar als men aanneemt dat deze hulpmiddelen, zeg, op een miljoen leerlingen zullen worden toegepast, dan zijn die kosten niet hoog en is het geld goed besteed”.

Dit antwoord is ongetwijfeld zeer ter zake. Het probleem ligt echter in de aanname aan het einde. Kan men zich in Nederland, met zijn vele ‘principiële’ territoria, zijn sectarisme, zijn pacificatiedenken, zijn vrijheid van richting en inrichting, voorstellen dat één veeleisende, gecompliceerde methode een miljoen keer wordt gebruikt? Zonder dat er telkens van alles aan veran-

(5) Core of this letter

Mathematics education (ME) and its research (MER) are in **disarray**. You don't have to be a mathematician to observe this: scientists and education researchers **who use mathematics** (perhaps not quite applied mathematics) are quite able to understand mathematics that is taught at the level of highschool or elementary school. They can recognize crummy "mathematics" when this is highlighted by someone else and exposed by mathematics itself.

Normal science is that research mathematicians, mathematics teachers and mathematics education researchers (the **RM-ME-MER** community) work towards ever better RM, ME and MER.

The **paradigm shift** is: that the disarray in ME and MER is being caused by the RM-ME-MER community **itself**.

When the guard allows barbarians into the city, then ask: "Quis custodiet ipsos custodes ?" This is easy to grasp, and doesn't require a detour via the academic journals. When the evidence is presented to you, here, then you (board of VOR and directors) should check the evidence, and take action upon it. It is wrong governance to let the evidence only be discussed in the academic journals, and leave the answer to some unspecified future. The proper answer is that the city council appoints able citizens to watch over the guards and perhaps replaces them. This is what forum theory, scientific integrity, parents and students will expect from you. The text below will indicate what you might consider to do, reasonably.

(6) Core, subcase on collapse of RME

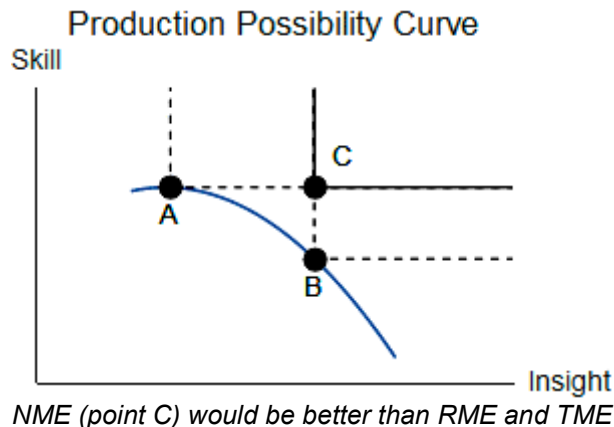
On teaching arithmetic in elementary school and the "rekentoets" in highschool, there apparently was a "math war", between two sectarian groups. These were **abstract thinking mathematicians** and educators inspired by them. Psychometricians had to step in for empirical testing (CITO). KNAW 2009 stepped in to settle the issue. This became a disaster:

- There is sectarian "realistic mathematics education" (**RME**) (Freudenthal Institute).
- There is sectarian "traditional mathematics education" (**TME**) (**Jan van de Craats** and his Stichting Goed Rekenonderwijs (SGR) with **Henk Tijms**).
- The chairman of the KNAW committee was mathematician **Jan Karel Lenstra** who has no background in didactics of mathematics.
- Psychometrician **Marian Hickendorff** clearly states that she keeps a distance from didactics of mathematics. But this means that she doesn't really study what she claims to study. Indeed, some of her "conclusions" (cum laude thesis) are invalid, see (7).

The result is a continued **unethical experiment on children** in primary education.
<http://www.wiskundebrief.nl/721.htm#5> In 2016, the board of NVvW doesn't stop this experiment but tries to save its skin **by inviting other educational fields to also employ arithmetic in class**, so that the burden of repairing what goes wrong in primary education doesn't fall fully on mathematics teachers in secondary education.
<http://thomascool.eu/Papers/AardigeGetallen/2016-03-09-Visie-NVvW-bestuur-op-de-rekentoets-klopt-niet.pdf>

Important **empirical observations** are also:

- **RME has been exposed as an ideology**, similar to astrology or homeopathy. **It doesn't work**. The Freudenthal Institute should not be at an university. See my letter to NRO.
<http://thomascool.eu/Papers/Math/2016-04-15-Letter-to-NRO.pdf>
- **TME is sectarian too**. See <http://thomascool.eu/Papers/AardigeGetallen/2015-09-23-SGR-deugt-ook-al-niet.html>
- My analysis – **NME**, neoclassical mathematics education – however provides a sound explanation for the structural problems in ME and MER – the **paradigm shift**. Obviously it is **new since 2008** and requires development and testing.
<https://boycottholland.wordpress.com/2016/01/24/graphical-displays-about-the-math-war>



(7) Core, subsubcase on psychometrics, VOR division assessment

Psychometrician **Marian Hickendorff** (Leiden, CITO) studies education in arithmetic and explicitly writes me (June 27 2014, see the link) that she keeps a distance from didactics of mathematics, which is recommendable for its openness, but it means that she doesn't study what she says that she studies. (a) Thus there is an issue of validity. (b) A problem with the response by Hickendorff is also that she doesn't forward my question to **her contacts who are** involved in didactics research. Who are these people at CITO ? (c) She could observe and wonder why there aren't more people looking in the disarray in mathematics education.

<http://thomascool.eu/Papers/AardigeGetallen/2016-01-31-Enkele-emails-rekentoets-psychometrie.pdf>

This issue is also strange since **psychometrics uses mathematics**, and a psychometrician should recognise criticism on so-called "mathematics".

PM 1. My book VTFD (below) ch. 7 discusses the Item Response Model / Elo Rating, which is used much in testing: <http://thomascool.eu/Papers/VTFD/VotingTheoryForDemocracy.pdf>

PM 2. You will be aware that assessment in education is a big world now, see for example the links of AEA, professor Eggen (principal assessment scientist at CITO) and professor Van der Linden (Pacific-Metrics Corp.). See also my remarks on Pierre van Hiele and Gerald Goldin.

<http://www.aea-europe.net/index.php/about-us/aims-and-objectives>
<https://www.utwente.nl/bms/omd/Medewerkers/medewerkers/eggen>
<https://www.utwente.nl/bms/omd/Medewerkers/medewerkers/vanderlinden>
<https://boycottholland.wordpress.com/2015/09/30/pierre-van-hiele-and-gerald-goldin-1>

Remarkably, this world of testing makes two crucial errors w.r.t. mathematics education in Holland, and doesn't respond quickly when these errors are pointed out:

- **Hypothesis:** Arithmetic must be learned in elementary school, to enter into **permanent** memory (mother language, bicycle riding). What is learned in highschool may enter in **long term** memory, but must be exercised ("Use it or lose it.").
Error 1: The testing community allows a "rekentoets" in highschool, without protesting that arithmetic must be mastered already in elementary school – and that once it has been mastered in elementary school then there is little use to test it in highschool.
- **Fact:** For the transition from arithmetic to algebra in highschool, pupils in elementary school must master the traditional algorithms.
Error 2: Testscores in elementary school (CITO and the thesis by Hickendorff) are based on correct / incorrect outcomes, and not on method. Thus education ideologies RME and TME may score alike on outcome (the major finding by Van Putten and Hickendorff, so that **KNAW / Lenstra** conclude that "the didactic way would not matter"), but pupils in elementary school who can use only RME will still be crippled for algebra in highschool.

See: <http://thomascool.eu/Papers/AardigeGetallen/2016-04-10-kern-misstanden.pdf>

I request action on this by the board of VOR and directors of Teacher Education.

Parallel to this, there is a VOR division on methodology & evaluation.

http://vorsite.nl/nl/divisies-en-themagroepen/methodologie_en_evaluatie.html

"De divisie maakt deel uit van de Vereniging voor Onderwijs Research (VOR) en is opgericht in 1992. Van de circa 80 leden zijn er 20 uitsluitend lid van deze divisie. De divisie onderkent dat er op diverse gebieden van methodologie en evaluatie gespecialiseerde groepen actief zijn. De divisie ziet voor zichzelf met name een taak om aandacht te besteden aan de raakvlakken tussen de diverse specialisaties."

For methodology, there is also this key issue (again with influence by De Groot):

<https://boycottholland.wordpress.com/2015/11/24/a-general-theory-of-knowledge>

(8) Summary

A summary of this letter is:

- Mathematics education (ME) and its research (MER) are in disarray.
- The major cause is that mathematicians are trained to think abstractly (leaving out aspects) while education is an empirical issue (with observation ("waarneming") that introduces news). The training for teacher of mathematics apparently can often not undo what has gone wrong before w.r.t. empirical attitude. When teachers of mathematics meet with real life students in class, they resort to tradition, which tradition has not been created with proper research in didactics.
- The situation requires a **re-engineering of ME**. Gradual change in ME is advisable but even this will not likely come about without some **crucial reorganisation in MER**.
- In 2008-2015 I have tried to clarify this to the community of ME and MER, and provided documentation in some five books (that will also be useful for you).
- My helpful analysis however met with misrepresentation and slander to my person. Apparently ME and MER have a history of "math wars".
https://www.researchgate.net/publication/228793650_The_math_wars (Schoenfeld)
<http://ed-osprey.gsu.edu/ojs/index.php/JUME/article/viewFile/190/115> (warrior)
<https://educationrealist.wordpress.com/2013/01/16/jo-boalers-railside-study-the-schools-identified-kind-of> (debunking)

NB. De Groot described Holland as having "an unusual degree of social cleavage".

Apparently, when one doesn't use empirics, then only logic and opinion are available to settle disputes, and logic is a dangerous method for who has an opinion.

The empirical data of 2008-2015 are evidence that the Nederlandse Vereniging van Wiskundeleraren (NVvW) is a very sick organisation.

Historically NVvW (ME) separated from research mathematics (RM). Recently, NVvW allies itself again with research mathematics in Platform Wiskunde Nederland (PWN), now with a "**Deltaplan Wiskunde**" that also affects the training of teachers.

Mathematicians have children in school from age 6 to 18, have every opportunity to show the beauty and relevance of mathematics, but bodge this, and then use subsidy funds to make more **advertisements** targeted at policy makers.

- A simple example of disarray is education on arithmetic, with the "rekentoets".
- A metaphor is that when the gatekeeper is very sick then citizens better help out. **Hence, I invite the larger academic community to focus the next years upon ME and MER, and help resolve the issue.** Fields like physics, biology, economics, etc. use mathematics, and have reason to look into this. (The advice for philosophy is to take MER as its empirical base anyhow, for philosophy may get lost in abstraction too.)

This letter contains suggestions of what would be effective and efficient **action**.

- Corroborate my advice to Parliament to have an enquiry.
- The unethical experiment on children must be stopped.
<http://www.wiskundebrief.nl/721.htm#5>
- The unscientific Freudenthal Institute in Utrecht cannot be at an university (letter to NRO).
- Misrepresentation and slander of my books EWS and COTP must be undone.
- A **Simon Stevin Institute** (SSI) must be created based upon principles of science, see:
<http://thomascool.eu/Thomas/Nederlands/Wetenschap/Artikelen/2008-11-11-Simon-Stevin-Instituut.pdf>
<https://www.knaw.nl/nl/actueel/publicaties/het-forumwaarmed-merk-van-wetenschap>
<https://boycottholland.wordpress.com/2015/10/31/the-power-void-in-mathematics-education>

(9) My MER: fundamental but still empirical (falsifiable)

My research on mathematics education (MER), with public texts since 2008, is of fundamental nature, see my letter to NRO / PROO. As an econometrician I am fully for **evidence based education** and thus proper testing. However, my resources are limited, and thus I focus on what I can do: analysis, in preparation of what might be useful for experimental testing. This also means that my results are preliminary and prospective. (The exception is that mere logic may show that something would be better (check the warning on logic).)

When you haven't heard about my research yet, then this is not because of lack of quality of this research. Results can be found on my website, in English at <http://thomascool.eu/Papers/Math/Index.html> and in Dutch at <http://thomascool.eu/Papers/AardigeGetallen/Index.html>.

For teachers and researchers of other fields, it is useful to mention:

- My economic analysis, which will not be in current textbooks
<http://thomascool.eu/Papers/Drgtpe/Index.html> (English, for fellow economists)
<http://thomascool.eu/SvHG/DenS/Index.html> (Dutch for the general public)
- The joint textbook on transport science with ir. K.F. Drenth (1945-2010) as main author
<http://thomascool.eu/Papers/TSOM/Index.html>
- Attention for language in the pronunciation of numbers, with "two-ten-one" for 21 (in Dutch "tig" rather than "tien" and thus "twee-tig-een") (German "zwei-zig-ein(s)")
<http://thomascool.eu/Papers/NiceNumbers/Index.html>

(10) My MER: content

In my practice as mathematics teacher, first in college (1997-2001) and later in highschool (2007-2011, parts), I met only competent and helpful colleagues. The joint attention was on teaching the existing curriculum. It was no use to discuss developing ideas on other approaches as presented here, since those were only in the stage of development and obviously didn't fit the present curriculum.

After I got my mathematics teaching degree in Leiden in 2008, I had reason to collect these new ideas and develop them in these books - the English ones have pdfs online:

- *Elegance with Substance* (EWS) (2009, 2015)
- *Conquest of the Plane* (COTP) (2011)
- *Een kind wil aardige en geen gemene getallen* (KWAG) (2012)
- *A child wants nice and no mean numbers* (CWNN) (2015)
- *Foundations of mathematics. A neoclassical approach to infinity* (FMNAI) (2015).

My major research finding has been stated above: (1) the need to re-engineer ME, (2) the need of a scientific environment to do this re-engineering in (SSI).

PM 1. EWS got a 2nd edition. Who reads COTP is advised to see the **Reading Notes** too, that will be used if a re-edition would occur.

PM 2. Before 2008 I had these books that are relevant for **matricola**. They already show the idea of re-engineering education, in this case for logic and voting theory:

- *A Logic of Exceptions* (ALOE) (1981 unpublished, 2007, 2011)
- *Voting Theory for Democracy* (VTFD) (2001, 2014)

(11) Focus on ME and MER community before writing this letter

Perhaps I should have become member of VOR when I received my highschool math teaching degree in 2008, but I also got a survey from the Ministry of Education on time allocation and I didn't have time even for that. I did visit ORD 2010 however, to meet **David Tall** and listen to **Nellie Verhoef** cs. on Lesson Study. It makes sense, however, that I didn't join VOR and focused on the ME and MER community.

- In 2008 I already diagnosed that the issue was fundamental, and I advised to an enquiry by Parliament. Parliament is a stakeholder with an umbrella position.
<http://thomascool.eu/Thomas/Nederlands/Wetenschap/Artikelen/2008-04-17-WiskundeOnderwijs.pdf>
<http://www.ipetitions.com/petition/tk-onderzoek-wiskundeonderwijs>
<http://thomascool.eu/Papers/Math/2013-02-06-Colignatus-nav-cTWO-Eindrapport.html>
<http://thomascool.eu/Papers/AardigeGetallen/2015-10-17-Aan-TK-commissie-OCW.html>
<http://thomascool.eu/Papers/AardigeGetallen/2016-03-12-Brief-aan-TK-cieOCW-onderwijs-wiskunde-rekenen-rekentoets.pdf>
<https://boycottholland.wordpress.com/2015/10/31/the-power-void-in-mathematics-education>
- For the (dispersed) scientific community, the reasoning is different. Researchers will tend to think: When you observe that the gatekeeper is deficient, allow for time to resolve it. When this avenue has been tried and evidently failed, only then it is fair and required to explicitly ask citizens to step in. **There is now the evidence of 2008-2015.**
- Below I mention also other venues that have been tried, like organisations PWN, FvOv & Platform VVVO (all of which NVvW is member) and KNAW / LOWI.

Having gotten stuck in the realm of ME and MER in 2008-2015, now I want to look to other **stakeholders** such as VOR and institutes for training of teachers in general.

While I advise Parliament to have a parliamentary enquiry, for science there is the advice to do **something of similar scope**. The (dispersed) scientific community consists e.g. of the journals (slow track) and institutional boards (fast track). The focus should be on creating an SSI, see below. Still, it is not unlikely that the scientific community, and VOR board, after studying the issue, only **corroborates** my finding that **an advice to Parliament is wise**.

(12) Core, Simon Stevin Institute (SSI)

As a researcher I am very modest about my results, and I agree fully with Gerard 't Hooft to **distrust suggestions to "change everything"**. Hence my position has always been:

- My results in ME and MER are modest, preliminary and prospective. At this stage they are **examples** of the need for re-engineering ME. See (9). COTP is a proof of concept.
- Discussion of such results is impossible both when mathematicians infringe upon empirical ME and MER and when there are these conditions of "math wars".
- Each nation needs to safeguard a proper research environment, and this is best done by means of a national institute based upon principles of science. For Holland let this be the **Simon Stevin Institute** (SSI).
<http://thomascool.eu/Thomas/Nederlands/Wetenschap/Artikelen/2008-11-11-Simon-Stevin-Instituut.pdf>
<https://www.know.nl/nl/actueel/publicaties/het-forumwaarmed-van-wetenschap>
<https://boycottholland.wordpress.com/2015/10/31/the-power-void-in-mathematics-education>

Thus, a key point for the larger academic community is to insist upon the creation of this **Simon Stevin Institute**.

- After this institute has been established there is proper scope for discussion of my findings on ME and MER.
- **Until SSI exists** it would be (*rather*, to allow for exceptions) **unscientific** and useless to draw conclusions about ME or MER, other than that SSI is needed.
- One can however already **conclude** that **Freudenthal Institute** and SGR (mentioned in the summary) are **unscientific institutes**: see the letter to NRO. Clearly, FI, or debunked the *Freudenthal Head in the Clouds Realistic Mathematics Institute* (FHCRI) **plays into the need** of some centralised institute w.r.t. MER, which enlightens the need for SSI. But FHCRI doesn't follow the rules of science and should not be at an university.

It may be useful to refer to this column, of which the title wasn't quite my choice:

<http://www.joop.nl/opinies/het-wiskundeonderwijs-moet-helemaal-anders>

(13) More on FI = FHCRI

Importantly: FHCRI is not the "national authority on ME and MER" and thus can formally reject "responsibility" for neglecting my work and for not defending my work against the abuse by others. However, they claim expertise on ME and MER, and thus should see the **quality of my work**, and as scientists they should be alarmed about the abuse. The neglect is telling.

FHCRI has gone into alliance with **science education research**. There is some crooked logic to it. In RME ideology, contexts are important. Natural sciences provide such contexts. Educators in these fields may enjoy the appreciation by RME, while they will have no inclination to study RME deeper. Thus education in science is an easy prey and willing victim of RME. Subsequently, the ideologues of RME are savvy in bureaucracy, and they know that when they don't do science at least they can hold on to the paraphernalia of science.

(The situation reminds of theologians.

<http://thomascool.eu/Papers/EWVJ/2015-05-22-Vier-vragen-NOSTER-deugen-niet.pdf>)

Still, it is remarkable that the **science education researchers at Utrecht University (UU) have not been able to debunk FHCRI and RME**, even given the national debate on the "rekentoets" that should have rung alarm bells.

It is an awkward issue, with the confusion of "context" and "applied mathematics". Teacher Pierre van Hiele (1909-2010) clarified that learning goes from concrete to abstract (and from vague to precise) which professor Hans Freudenthal (1905-1990) distorted into applied mathematics, which is something different. Freudenthal's misconception can be understood by observing that he had been trained on abstraction and not on empirical research. There now is the confusion by psychologist Stellan Ohlsson who mistakes the route "from vague to precise" as a route "from abstraction to concrete".

<https://boycottholland.wordpress.com/2015/09/03/pierre-van-hiele-and-stellan-ohlsson>

The science education researchers at FHCRI claim to study education and didactics. All considered, they ought to accept the responsibility of having chosen to join up with FHCRI and hence suffer its fate. This also means that "researchers" working at FHCRI can not be trusted as unbiased. Best is that they may have the status of **"hostile witnesses"**.

The following links give some background information w.r.t. FHCRI "researchers" **Van Maanen, Drijvers, Daemen, Van der Kooij and Doorman**.

- <http://thomascool.eu/Papers/BHRM/2015-10-28-Malconduct-VanBerkel-VanMaanen-Goedhart-LB-VG.pdf>
- <http://thomascool.eu/Papers/BHRM/2015-10-28-Malconduct-Roorda-Daemen-Drijvers.pdf>
- <http://thomascool.eu/Papers/AardigeGetallen/2015-11-06-Mediabericht-VanHiele-Freudenthal.pdf>

- <http://thomascool.eu/Papers/AardigeGetallen/2016-03-11-Henk-vd-Kooij-Freudenthal-VanHiele.pdf>
- <http://thomascool.eu/Papers/AardigeGetallen/2016-03-11-NVW-is-een-ernstig-zieke-vereniging.pdf>

(14) Caveat on mentioning persons by name

I give critique on **content** and not on **person**. If one thinks that a text reads otherwise, *read again* with the focus on content.

Subsequently, there are issues on **behaviour**, see also A.D. de Groot on Forum Theory.

My critique is precise in both cases. For behaviour it is focused on *specified* statements and acts on content, at specified locations and times.

- A grand sweeping statement like "mathematicians are trained for abstraction and not for empirical science" is indeed "imprecise" in some respect but it is based upon institutional arrangements and general statistics, and not a labelling of "all mathematicians".
- Some persons are mentioned because they **breached integrity of science** in a manner that likely is **pivotal** for the process of handling the present **paradigm shift**. See (27). A single breach doesn't necessarily make a person unreliable, but one cannot deny the empirical observation of the *math wars* and so on.

When I mention persons in this letter, then this doesn't mean necessarily that I have studied their work and performances to full extent, or that I am in a position to judge. Please be aware of these distinctions:

- What is at issue in this letter is what has been stated in Core (5) and Summary (8), and the other sections are supportive but still relevant.
- Some actors in the field are mentioned merely to provide background and overview of what has been happening.

(15) Example: notation of mixed fractions

It will be useful to give some examples, so that other fields may get an idea what the discussion may be about. Giving an example is risky since readers might misread this.

- My main point is not that these examples must be implemented, but my main point is that these issues require decent **research** and an environment of a **Simon Stevin Institute** (SSI) for such research and resolution.
- Giving an example may have the effect of a discussion of the pro's and con's of that very example. This however is not the intention either. The discussion by the boards of VOR and others should be on the core issue presented here.

Fractions are important in elementary school and predictive for later learning. The *Center for Improving Learning Fractions* (CILF) speaks about a "frontier".

- <https://sites.google.com/a/udel.edu/fractions/home>
- <http://www.psy.cmu.edu/~siegler/Siegler-et-al-2013.pdf>
- <http://www.wsj.com/articles/SB10001424052702303759604579093231122420774#:kcgBH1zSjVVZnA>

The traditional notation of a mixed fraction like **four-and-a-fourth** is $4\frac{1}{4}$. Elementary schools spend a lot of time on this. Textbooks of "realistic mathematics education" (RME) tend to delay calculation of more complicated questions like $2\frac{1}{2} / 4\frac{1}{4}$ as much as possible, and shift the burden to highschool.

Now consider the **paradigm shift** that the problem lies not with pupils but with "mathematics".

- The expression $4\frac{1}{4}$ reads as **four-times-a-fourth**. The proper notation is $4 + \frac{1}{4}$.
- Terms like *third*, *fourth*, *fifth* are **rank numbers**, when putting items in order (ordinals).
- There is the fundamental problem with the pronunciation of numbers anyhow.
<http://thomascool.eu/Papers/NiceNumbers/Index.html>
<http://www.joop.nl/opinies/algemeen-beschaafd-rekenen>

I wrote about this in *Elegance with Substance* (2009, 2015). In his "review", **Ger Limpens** (CITO) duly noted it. Did it ring alarm bells? I haven't heard of an investigation by CITO.

<http://thomascool.eu/Papers/Math/2010-12-Euclides-86-3-p130-131-a.jpg>

PM. Limpens is not an economist. But he has a background of higher education and should recognise it when an economist presents an analysis to a general audience while explaining that it is economics. Unfortunately he doesn't, and the economic reasoning on Simon Stevin Institute (SSI) is lost on him. In 2012 I hoped that time and patience would help, but alas.

Also **Jan van de Craats** of the sectarian SGR and "traditional mathematics education" (TME) knows about this since 2008 and doesn't do anything about this (and prefers $5/2$ over $2\frac{1}{2}$).

<https://boycottholland.wordpress.com/2015/09/19/jan-van-de-craats-tortures-kids-with-fractions>

I request action on SSI. Parallel, there is the VOR division on learning and instruction.

http://vorsite.nl/nl/divisies-en-themagroepen/leren_en_instructie.html

"De divisie Leren en Instructie is opgericht in 1992 en telt meer dan 190 leden. De divisie richt zich op vraagstukken omtrent de wijze waarop leer- en onderwijsprocessen verlopen, in onderlinge samenhang kunnen worden vormgegeven, en effecten daarvan. Deze vraagstukken worden niet alleen vanuit de onderwijskundige discipline bekeken, maar ook vanuit recente inzichten uit aanverwante disciplines, zoals sociale en culture psychologie, organisatiepsychologie, en neuropsychologie."

(16) Example: negative numbers and fractions

There are at least two ways to denote fractions: $1/x = x^{(-1)} = x^{-1}$. Pupils in elementary school are trained on $1/x$ and later there is the "surprise" about the notation with the negative exponent. Writing fractions as $1/x$ causes various reworkings that aren't mathematically relevant, and are only caused by the manner of denoting.

Pierre van Hiele (1909-2010) advised in 1973 to drop $1/x$ and use the power form from the start. Indeed, why create ballast and artificial "surprise"? I myself wasn't convinced since the -1 may suggest to pupils that they must subtract something. It was a fundamental discovery in August 2014 to use $H = -1$, as a mathematical constant like imaginary root $i = \sqrt{-1}$, that recovers a hidden algebraic element in arithmetic. This I did for negative numbers first, where H is used only for introduction and **remedial teaching**. This was followed by use of H for fractions in September 2014, following Van Hiele.

Thus: abolish $1/x$ and use $x x^H = 1$ for $x \neq 0$. Pronounce H as "eta" and x^H as "per x ".

<https://boycottholland.wordpress.com/2014/09/04/with-your-undivided-attention/>

For example, pupils now must master that $1/a \times 1/b = 1/(a \times b)$ and later they must also master that $a^{-1} \times b^{-1} = (a \times b)^{-1}$ but it would be more efficient to have from the start (commonly in algebraic form, and only with numerical value when useful for simplification):

$$a^H b^H = (a b)^H$$

My suggestion for the use of H is only tentative, and I will be interested to see the results of field tests. Obviously it will take a lot of research and committee work and retraining and

calculator remanufacturing before this is fully implemented, but the ME and MER community can speed things up by allowing $H = -1$ in official exams, and the like. Stating $H = -1$ in an exam paper is obviously allowed, but one should also allow the use of H without further clarification, like students don't have to explain about $+$ and π . Agreement to use H in this manner is also relevant for said *field tests*. Research nowadays is a rather involved affair.

I first collected the relevant papers in the book CWNN in 2015, and only got in 2016 to submit the following article to *Euclides*, the journal of NVvW. This paper also explains what happens when sections (15) and (16) are combined.

<http://thomascool.eu/Papers/AardigeGetallen/2016-01-10-negatieve-getallen-breuken-Simon-Stevin-Instituut.pdf>

(17) Counting one's blessings

- EWS was maltreated by **Ger Limpens** but he agreed that it was useful, score $\{1/2, 0\}$.
- **Richard Gill** advised positively to read EWS and COTP with an open mind, score $\{1, 0\}$.
- **Jose Manuel Gamboa** of Madrid (UCM, EMS) admits of disquieting feelings but ends up positive, score $\{1, 0\}$. <http://www.euro-math-soc.eu/review/conquest-plane>
- **Jeroen Spandaw** misrepresented and slandered, score $\{0, 1\}$.
- **Christiaan Boudri** however protested against that, score $\{1, 0\}$.
<http://thomascool.eu/Papers/COTP/2013-03-15-Boudri-over-COTP.pdf>

Total $\{3 + \frac{1}{2}, 1\} = \{3 + 2^H, 1\}$

Counting in this manner is tricky since other readers might think that it is useless to state a view. On the other hand, the above are more **structured direct invitations for a review**. Less structured are:

- See guarded statements by **Jan van Maanen** (FHCRMI) and **Jan van de Craats** (SGR) here: <http://thomascool.eu/Papers/AardigeGetallen/2016-04-10-kern-misstanden.pdf>
- See other statements on EWS, also by minister **Ronald Plasterk** who claims that Simon Stevin Institute would increase institutional complexity while **I certify as an economist** that it will change the current jungle into transparency required for science, education and democracy. <http://thomascool.eu/Papers/Math/2009-10-15-Reacties.pdf>
- There is the question how to count the reaction of a webmaster and retired mathematics teacher at NVvW internal-web-forum who starts stalking:
<http://thomascool.eu/Papers/AardigeGetallen/2016-04-12-stalker-kat-op-webmaster-spek.pdf>

For economists, there is a review of EWS in TEO:

"Een bespreking in het *Tijdschrift voor het Economisch Onderwijs* (2009, no 4, p34) geeft daarentegen de argumentatie netjes weer."

"Een som is $\frac{1}{2} + \frac{3}{4} = 1 + \frac{1}{4}$. Op deze wijze geschreven blijft de wiskunde volstrekt helder, en het is verlost van het risico van die genoemde fout en de noodzaak van het leren van zo'n uitzondering. Hiermee is ook verhelderd dat het schrijven van $2 + \frac{1}{2} = 2\frac{1}{2}$ alleen maar een som lijkt en geen echte som is."

"We hebben nu dus zowel wiskundigen die hun kop in het zand steken en als een CPB dat adviseert dat we meer van zulke wiskundigen krijgen en dat er op school meer uren voor worden vrijgemaakt. De situatie is belachelijk en gevaarlijk."

<http://thomascool.eu/Thomas/Nederlands/Wetenschap/Artikelen/2011-07-12-Colignatus-Wiskunde-CPB.html>

(18) Consequences for education in other fields like physics etcetera

When **ME is re-engineered**, then also **other fields** like physics, biology, economics, etc. that use mathematics will meet with **new forms**.

The questions for these other fields are:

- Does one rely on the (currently disfunctional) MER community as gatekeeper ?
- RM-ME-MER say that they protect other fields from "mathematics" but they create it.
- Does one accept results by a single author ? Single ? *You can check basic math.*
- Are researchers and teachers in other fields mathematically and scientifically competent enough to see that the RM-ME-MER themselves have been the source of major problems with ME and MER, **and that they maltreat criticism on this**, so that the gatekeeper is disfunctional ?
- Are the "rekentoets" and the *examples* in my books and the collected evidence of 2008-2015 **sufficient evidence** for the academic community **to achieve a focus on the key issue**: the creation of SSI ? (With a functional gatekeeper in the future ?)

(19) Consequences for the curriculum

Some issues are more involved than just rewriting some textbooks.

(A) In the past, changes started in university and trickled down to elementary school. Nowadays, findings in social and cognitive psychology, technology, and the **paradigm shift** w.r.t. ME and MER turn elementary school into a hotbed for change.

<http://thomascool.eu/Papers/AardigeGetallen/2016-03-08-Post-HBO-opleiding-rekencoördinatoren.pdf>

(B) It is a question whether education researchers are fully aware of **Van Hiele's theory of levels of insight**. This may for example also have consequences for language education (where it seems that levels are recognised, but perhaps without Van Hiele's explanation).

<https://boycottholland.wordpress.com/2015/11/24/a-general-theory-of-knowledge>

<https://boycottholland.wordpress.com/2015/11/06/pierre-van-hiele-and-adriaan-de-groot>

(C) In my student days in Groningen, when I learned of **logic** and **set theory**, I wondered why these fundamental insights were not already included in elementary school. These are wonderful for trained reasoning: shouldn't pupils have this opportunity too ?

Now, I arrive at this explanation:

- Elementary school loses so much time on "mathematics", like the wrong notation of fractions, that including logic seems like introducing a new subject that would require more time than there is.
- The ME and MER community adopts "mathematics" as sacrosanct, but cannot deny that pupils have difficulties, whence it tries to find other ways to reduce those difficulties. This causes the RME and TME math wars. Mathematical abstraction and sectarian views block attention for the **paradigm shift**.
- There are some issues like the Liar Paradox and Gödel's Theorems and Cantor's Diagonal Argument that cause some mathematicians to wonder whether it has any use to discuss logic and set theory in elementary school. When mathematicians themselves aren't confident, would educators dare to think differently ?
- There was already an effort to introduce logic and set theory in highschool, called the "New Math". But abstract thinking mathematicians had no real idea how to do this in empirically sound didactics. Subsequently, this was introduced in too abstract manner and failed miserably, and caused the math wars of that period.
https://en.wikipedia.org/wiki/New_Math (no source but a portal)
(It was also this failure of the New Math that gave Hans Freudenthal a window of opportunity for his approach, in which Freudenthal elbowed out Pierre van Hiele.)
- **Mathematics educators may not think straight**. The current Dutch programme has four levels of math, in order of alpha to beta: C, A, B, D. Logic is now re-introduced in highschool in category C. This assumes that A, B, D have no use of symbolic logic ?

http://www.fi.uu.nl/wiskrant/artikelen/302/302december_vanbergen.pdf

<https://www.nvon.nl/sites/nvon.nl/files/wic2018syl.pdf>

Curiously in this material, truth tables are presented in the (Polish) order of {False, True} or {0, 1} instead of the common and more didactic order (True, False} or {1, 0}.

p12

http://www.fi.uu.nl/ctwo/lesmateriaaldir/ExperimenteelLesmateriaal/VWO%20Wiskunde%20C/Logisch%20Redeneren/Oud%20materiaal/oudeversies/20081029_redeneren_deel1.pdf

<http://www.fisme.science.uu.nl/ctwo/lesmateriaaldir/ExperimenteelLesmateriaal/VWO%20Wiskunde%20C/Logisch%20Redeneren/>

Considering this explanation, the situation is pretty messy. The **paradigm shift** provides clarity. It would be **possible** to introduce elementary logic and set theory in primary education. This should affect trained reasoning by pupils, and thus affect the whole curriculum, for example also w.r.t. computer algebra and programming.

(D) I agree with Henk Boonstra that elementary school should be structured in levels like highschool is.

<http://thomascool.eu/Papers/Math/2016-03-16-Henk-Boonstra-on-Elementary-School.html>

(E) The notions in this section would be relevant for all education researchers, and notably those of the curriculum.

<http://vorsite.nl/nl/divisies-en-themagroepen/curriculum.html>

QUOTE

- Keuzeproblemen omtrent de concrete invulling en uitlijning van een curriculum
- Beleidsmatige aspecten van curriculaire besluitvorming
- Het ontwikkelen, beproeven en implementeren van curricula
- Deskundigheidsbevordering van docenten en opleiders

UNQUOTE

(20) Dirty math wars in Holland: Leibniz and "Let us calculate !"

There is a narrative that Leibniz wanted an universal language so that differences in opinion could be settled by "Let us calculate !". Science adopts that attitude, and my leading example is Jan Tinbergen. <http://thomascool.eu/Thomas/Nederlands/TPnCPB/Tinbergen.html> It is another narrative that mathematics is closest to that idea of an universal language, or, that mathematicians can resolve differences by the method of *definition, theorem, proof*. I would have very much appreciated that attitude, for it would have prevented a lot of noise. For education the method of *definition, theorem, proof* doesn't work, and thus my work is structured differently. Persons in the RM-ME-MER community who criticise my work however have the tools of mathematics available to give shape to that criticism. There is a great difference however in:

- giving proper critique in mathematical form, as I do w.r.t. "mathematics"
- abusing mathematics and authority to denounce sound criticism on "mathematics".

A mathematician wrote to me on March 7 2012:

"Once you have irritated old-style mathematicians (...) they turn, of course, into crackpot interception mode. Start nit-picking, misunderstanding, finding real small errors, maybe some big ones, but certainly consistently misunderstanding what you are trying to say. We all get letters and papers from crackpots who are squaring the circle, proving that Bell's theorem is wrong, or solving the P=NP problem. (...) It's quite a sport to show in public to your mathematical friends that these crackpots are a public nuisance. (...) You drew attention to yourself, you got attention, and now

several Delft mathematicians are thoroughly enjoying a little group-crackpot-ridiculization. But I could say (and in fact do) that one could say that you asked for this! Never mind. Remember Gandhi: first they ignore you, then they fight you, then you win."

I object that I "asked for it". My attitude and results are modest, see (9) and (12).

Martin Gardner (1981), *Science: Good, Bad, and Bogus*, Avon Books, has an entertaining introduction about crackpots and pseudoscience, but he however inconsistently argues for both skepticism and making fun of bogus, forgetting that a skeptic would question the criteria for bogus. I suppose that such inconsistency can only be resolved by common sense, and it is common sense to be careful about one's sense of humour.

In economic science, researchers tend to show a liberal attitude, in which they can disagree but still help each other to clarify an argument. By comparison, I observed that mathematicians apparently have a culture to make fun of crackpots, ditching content and going after the person. With some amateur psychology I try to understand this as follows: perhaps mathematicians suffer from a fear to make an error and to be ridiculed, and then find relief in making fun of others who they think can be exposed as the "real" crackpots. This also explains the verbal abuse that I meet when I criticise "mathematics" in ME, when mathematicians feel a need to defend their field, as if it would be personal. Whatever that be, this culture apparently exists.

When there is a **paradigm shift** then it is fully acceptable that people have cognitive dissonance. But there is really no need to misrepresent and slander.

(21) Dirty math wars in Holland: NVvW, Euclides, EWS, COTP

EWS and COTP got **some positive reviews**, see their websites, but to my horror the two books were misrepresented, with slander about my person, in *Euclides*, the apparently sick journal of the apparently sick Nederlandse Vereniging van Wiskundeleraren (NVvW).

This is the "review" of EWS by **Ger Limpens** (test expert at CITO), and it is a good exercise to spot the banter, misrepresentation and slander.

<http://thomascool.eu/Papers/Math/2010-12-Euclides-86-3-p130-131-a.jpg>

See my comments w.r.t. this "review" in my letter to Parliament:

<http://thomascool.eu/Papers/AardigeGetallen/2015-10-17-Aan-TK-commissie-OCW.html>

The board of CITO never published a text like for example (my guess):

"Ten aanzien van het boek "Elegance with Substance" (2009) door Thomas Colignatus heeft de raad van bestuur van CITO geschokt kennis genomen van de badinerende en lasterlijke tekst door CITO-medewerker en toetsdeskundige wiskunde Ger Limpens in het blad *Euclides*, waarbij naast diens naam ook de naam van CITO staat vermeld. Ons is nog niet gebleken dat Limpens op de werkplek bij CITO ook zulke badinerende en lasterende teksten heeft gebruikt. Om die reden hebben wij besloten de externe vrijheid van meningsuiting van Limpens te respecteren. Wij hebben hem verzocht voortaan die vermelding van CITO achterwege te laten behalve wanneer hij voor zijn werk schrijft vanuit CITO. Wij zijn het volstrekt eens met Thomas Colignatus dat de redactie van *Euclides* deze badinerende en lasterlijke tekst niet had moeten plaatsen. Tevens verbazen wij er ons over dat bij de Ned. Ver. van Wiskundeleraren geen protesten tegen deze tekst zijn geuit. Wij zullen derhalve een advertentie in *Euclides* plaatsen waarin wij dit standpunt zullen weergeven. Wij gaan ervan uit dat de redactie van *Euclides* ons hiervoor geen rekening zal sturen. Vervolgens is ons gebleken dat het door Limpens belasterde boek belangrijke inzichten bevat t.a.v. het onderwijs in wiskunde en het toetsen van kennis van wiskunde. Ook is ons gebleken dat Limpens deze kennis verder niet heeft gebruikt voor het werk binnen CITO. Ook is ons gebleken dat later Jeroen Spandaw een

ander boek van Colignatus belasterde, namelijk "Conquest of the Plane" (2011). Met zijn beroepsmatige kennis had Limpens kunnen zien dat die tekst van Spandaw lasterlijk was, en hij had dit aan ons moeten melden, omdat CITO voorstander is van een fatsoenlijke discussie, en omdat CITO alleen op die wijze aan correcte informatie kan komen ten behoeve van het werk van CITO. De raad van bestuur van CITO stelt vast dat CITO schade heeft ondervonden door deze twee daden van Limpens: het achterhouden van kennis en het niet aan ons melden van beschadiging van kennis. Derhalve heeft CITO besloten om de heer Limpens per direct te ontslaan, en een belangrijk deel van het salaris sinds 2009 terug te vorderen. Gekeken wordt of er compensatie mogelijk is voor auteur Colignatus." (No real quote !)

Then there is this "review" of my book *Conquest of the Plane* (COTP) (2011). Dr. dr. **Jeroen Spandaw** (mathematician and mathematics teacher trainer at TU Delft, with *Habilitation*) misrepresented COTP and slandered about my person.

<http://thomascool.eu/Papers/COTP/2012-02-13-Colignatus-reactie-op-Euclides-87-4-p168-170.html>

- COTP deals with the empirical science of didactics of mathematics, which differs from abstract mathematics itself. This would fit Spandaw's official job at TU Delft.
- My impression is that the "reviewer" forgot about empirics and as a mathematician got into that "crackpot interception mode".
- In 2016 the "review" still needs to be corrected.
- In 2012+ Spandaw has been disfunctional at TU Delft and in the MER community.
- In the "review" Spandaw states that he "lost days of his life" on reading the COTP and writing the "review", with 14 pages of comments. This may be indicative of a **paradigm shift** but is first and foremost evidence of the **mathematical culture** of the math wars and the "crackpot interception mode".

When I protested, the editors of *Euclides* blocked review of KWAG and subsequent books. The NVvW board allowed this **ad hominem censorship**. Hence, since 2012 my diagnosis is that NVvW is a very sick association.

<http://thomascool.eu/Papers/AardigeGetallen/2016-03-11-NVvW-is-een-ernstig-zieke-vereniging.pdf>

There are distinct positive aspects of NVvW.

- For example, I could present some ideas in a workshop at the annual study day in 2013, that was well-received, see (39).
- There is this statement that exonerates some slander on COTP:
<http://thomascool.eu/Papers/COTP/2013-03-15-Boudri-over-COTP.pdf>

Overall, however, Limpens and Spandaw did not correct, my other books remain blocked and the warning about NVvW in 2008-2015 is quite solid.

Check the score $\{3 + \frac{1}{2}, 1\}$ in (17). Whatever the positive reactions, doesn't that 1 hugely negative misrepresentation and slander catch all the attention ?

(22) Dirty math wars in Holland: Beter Onderwijs Nederland (BON)

The board of BON (Ad Verbrugge) doesn't do anything about misrepresentation and slander by mathematicians in the BON forum (and potentially elsewhere too). These aren't structured invitations for review, but spontaneous outbursts in bias and hate.

- <http://thomascool.eu/Thomas/Nederlands/Wetenschap/Brieven/2009-02-19-BON-Gedoe.pdf>
- <http://www.thomascool.eu/Papers/Drgtpe/Crisis-2007plus/2012-01-11-FatsoenMoetJeDoen.html>

(23) Dirty math wars in Holland: Euclides 2016

See (16) for the paper 2016 that I submitted to Euclides, on negative numbers and fractions.

Given the enormous problems that many students even in highschool have with negative numbers and fractions, publication of this article should be obvious and a prime priority. To my "surprise" (I was surprised indeed, but quickly sobered), there wasn't enthusiasm, but a curt rejection. This is the email exchange with the new chief editor **Tom Goris**.

<http://thomascool.eu/Papers/AardigeGetallen/2016-03-09-Emails-negatieve-getallen-breuken-SSI.pdf>

"Hallo Thomas,
Ik heb de bijdrage bestudeerd en aan een ander redactielid voorgelegd. We vinden de bijdrage niet geschikt voor de Euclides, omdat deze niet goed bij de doelgroep van ons blad past. Dit omdat we liever schrijven over concrete zaken waar de docent direct iets mee kan of wat informatie geeft over huidige ontwikkelingen. Het zou meer gepast hebben in de Nieuwe Wiskrant, maar die bestaat helaas niet meer. Is het een idee om het aan te bieden bij het Nieuw Archief? Ik denk dat hun doelgroep zich meer kan vinden in een nieuwe benadering van fundamentele wiskundige technieken.
Met vriendelijk groet!
Tom Goris"

This isn't a single error but it is a pattern.

- Tom Goris is a rather new chief editor at Euclides. He partly works at FHCRMI. "Nieuwe Wiskrant" was a publication by FHCRMI, and Goris was involved with this before it was abolished.
- From Goris's reaction to the paper on H , I gather that he has little insight in the didactics of negative numbers and fractions. His phrase "new approach of fundamental mathematical techniques" is crooked, for the paper suggests a new approach of **didactics** of fundamental mathematical techniques. Submitting the paper to "Nieuw Archief" (NAW) is nonsense since there is mathematically no news in writing $H = -1$. (It is interesting to look at consequences for group theory, but I have had no time for this yet, other than that a bit of rewriting might also be interesting for highschool, as Van Hiele 1973 already remarked.)
- I asked Goris to lift the *ad hominem* censorship w.r.t. my books, but he didn't respond. <http://thomascool.eu/Papers/AardigeGetallen/2016-03-10-Email-Euclides-tav-censuur-boeken.pdf>
- Goris allowed a paper by **Michiel Doorman** that referred to Hans Freudenthal for the notion of anti-didactic inversion of the earlier didactics of Euclid's *Elements*, which notion Freudenthal however fraudulently took from Pierre van Hiele. When I asked for a correction, Goris rejected this. Doorman wrote an email that didn't deal with the question. See p8: <http://thomascool.eu/Papers/AardigeGetallen/2016-03-11-NVVW-is-een-ernstige-zieke-vereniging.pdf>
- Goris allowed **Kees Hoogland** (APS) to abuse a book by John Allen Paulos, by suggesting that it would be in the line of "realistic mathematics education" (RME). Hoogland holds that current education is inadequate *because* there isn't enough attention for RME so that teachers are advised to spend time on that book. When I asked for a correction, Hoogland did not do so, and neither provided an English translation so that J.A.P. could see the abuse for himself. Obviously I will not translate since then Hoogland might argue that I translated wrong. See: <https://boycottholland.wordpress.com/2016/03/26/abuse-of-john-allen-paulos>

A chief editor of *Euclides* doesn't have to work at an university. Given above *pattern* I doubt that Goris is a scientist, and he better isn't an editor of *Euclides*. FHCRMI should not be at an university either.

(24) Dirty math wars in Holland: Will other fields accept this ?

Other educational fields like on physics, etc. are presented with Spandaw's view that my analysis on didactics would be pseudomathematics. Who are they to believe ?

- Mathematics is clear. I re-engineer "mathematics" and present clarity. My books are not in the format of "definition, theorem, proof" (as textbooks nowadays aren't), but they are clear, and other fields that use mathematics can check the arguments.
- There is already this example:
<http://thomascool.eu/Papers/COTP/2013-03-15-Boudri-over-COTP.pdf>
- Spandaw has rejected my criticism, without going into detail however. (He didn't give me a copy of his 14 pages of comments.) Other fields can check pro and con, and state their finding. Perhaps Spandaw takes other people more seriously than me, and will finally respond to my rejoinder in the detail required.
<http://thomascool.eu/Papers/COTP/2012-02-13-Colignatus-reactie-op-Euclides-87-4-p168-170.html>
- **Observe that others must step in.** NVvW and ELWIER (trainers of math teachers) have shown not to care.
- **The focus should be on the creation of the SSI.** Once it exists, then issues on ME and MER can be resolved again within this community. What others say will be preliminary.
- **PM.** For SSI it would help when there would be more teachers and researchers who are competent for more subjects, like *physics & math* or *economics & math*.

It would be **effective and efficient** when **teachers and education researchers** for **other fields that use mathematics** would:

- Study EWS and COTP and related material on my website
- Debunk Limpens' and Spandaw's misrepresentation and slander
- Or at least mention their questions, which would also become available to the future SSI
- State a view on the need for such a SSI.

(25) NRC Handelsblad on Edward Frenkel and math anxiety ("wiskunde-trauma")

NRC Handelsblad had an interview with Edward Frenkel, his book *Math & Love*, and his mission to do something about math anxiety (April 23 2016). My comments are here:

<https://boycottholland.wordpress.com/2016/04/28/edward-frenkels-love-reaches-holland>

I sent this letter to the NRC Handelsblad science editors:

QUOTE

Frenkel is geen didacticus wiskunde

Het interview met Edward Frenkel (23 april) "Trauma van wiskunde? Wees niet meer bang!" toont ons een wiskundige maar niet iemand die studie heeft gemaakt van didactiek van wiskunde. Wiskundigen worden opgeleid tot abstractie (zaken weglaten) maar didactiek is een empirische wetenschap (zaken ontdekken). De training tot abstractie veroorzaakt juist verblindheid bij empirische waarneming. Dit verklaart het structurele probleem in het onderwijs in wiskunde, alsmede mijn advies tot een parlementair onderzoek daarnaar. Het is een misverstand te denken dat een wiskundige qualitate qua ook zou weten hoe onderwijs werkt. Wiskundigen voeden dat misverstand met het naïve idee dat "onderwijzen en leren van wiskunde gaat het beste door gewoon wiskunde te doen". Daar komt werkelijk toch meer voor kijken. Frenkel is als een astroloog of een homeopaat die zonder onderzoek maar iets roept omdat het zo mooi klinkt dat het waar moet zijn. Door dit interview te plaatsen toont uw redactie het verschil tussen wiskunde en wetenschap niet te begrijpen. Zie mijn boek "Elegance with Substance" (2009, 2015), pdf online:
<http://thomascool.eu/Papers/Math/Index.html>

Thomas Colignatus
Econometrist (Groningen 1982) en leraar wiskunde (Leiden 2008)
Scheveningen

UNQUOTE

(26) Core continued

Please observe that it is not unreasonable for me to ask of VOR and institutes that train teachers to take a stand against maltreatment, misrepresentation and slander, as this happens **in their realm of interest**, also given the importance of mathematics education for pedagogy and education in general, and given that other venues for resolution have led to nothing (or worse).

It is not unreasonable to emphasize the **need** to take a stand, given that it may be **pivotal** for subsequent changes, notably the creation of SSI.

- Obviously "merely taking a stand" should not be interpreted as blindly protesting. One would set up a reading commission, etcetera.
- Obviously it doesn't do to refer to ALLEA / KNAW / LOWI / CWI TU Delft, and say that the issue "has been discussed and dealt with", since one can easily check that they didn't set up a reading committee, see (27).
- While writing this letter I observed that VOR has a code of conduct, and that also outsiders can do an appeal on this w.r.t. members of VOR. Potentially this might be useful, but now I maintain the original focus on the structural problem.

(27) Disfunctional KNAW / LOWI

W.r.t. Spandaw's "review" of COTP, an appeal to scientific integrity did not help. TU Delft (Commissie Wetenschappelijke Integriteit, CWI) refused to install a **reading commission** and rejected the appeal on superficial argument. Supervising KNAW / LOWI allowed this.

<http://thomascool.eu/Papers/COTP/LOWI/Index.html>

Overall, ALLEA / KNAW / LOWI have a limited approach to scientific integrity.

- Limited scope in itself <https://boycottholland.wordpress.com/2015/11/26/allea-defines-research-integrity-too-narrow>
- In cases of breaches by individuals the burden of proof is put on who observes a potential problem (as in administrative law) while there should rather be a district attorney with a detective squad and then a judge (as in penal law), see the individual cases mentioned under (13), not only at FHCRMI but also others, and also these cases:
<http://thomascool.eu/Papers/Math/2015-09-15-Breach-by-Jan-van-de-Craats-and-Ben-Wilbrink-wrt-scientific-integrity.html>
<http://thomascool.eu/Papers/Math/JB/Index.html>
- for collective breaches, there are no rules at all <http://thomascool.eu/Papers/Math/2014-07-08-Colignatus-aan-KNAW-LOWI.html>

(28) FvOv and Platform VVVO

On March 6 2016 I contacted the boards of two unions of associations-of-teachers, FvOv and Platform VVVO, of which NVvW is a member. The relevant context was **Onderwijs2032.nl**, that affects teachers in various fields. To my regret, interest was declined.

Please observe my economic analysis about the market structure of **monopsony**, with a single demander (government) and multiple suppliers (teachers). This can likely be extended from math teachers to teachers of other fields. It is unfortunate that FvOv and Platform VVVO did not respond to this either.

<https://boycottholland.wordpress.com/2015/10/31/the-power-void-in-mathematics-education/>

(29) PWN, also on economics

I have alerted PWN (the alliance of NVvW and research mathematicians KWG) on various occasions.

- Potentially, research mathematicians (RM) might be shocked by seeing how mathematics education (ME) is affected by crummy "mathematics". However, they allow NVvW to pursue its course. (Internationally, professor H.H. Wu has long discussions on School Mathematics, but his view is traditional, and doesn't include the **paradigm shift**.)
- I gave PWN director **Wil Schilders** a copy of COTP and he promised to read it. I haven't heard from this.
- PWN has a committee on education, PW-NOCW, that reports to the **international IMU / ICMI**. PW-NOCW disinclines interest or even speaking with me.

PWN spends part of their subsidy income on fellow-economists at Deloitte, for a report "*Mathematical sciences and their value for Dutch economy*" (2014). This report stretches the truth so much that the outcome (**30% of GDP**) is rather useless. A much better approach would have been that PWN had instructed these fellow economists to speak with me, and that their report would have replied to some serious questions, like the cost of silencing criticism, and abusing public funds to make **advertisements** to policy makers.

"Platform Wiskunde Nederland" is the organisation that represents the Dutch mathematics community. Its mission is to enhance the financial, managerial, scientific and public position of mathematics in the Netherlands. To better understand the contribution of mathematical sciences to the Dutch economy, the board of PWN has requested Deloitte to assess the economic impact of mathematics on the Dutch economy."

"Because these are high income jobs, the economic contribution of mathematical sciences is even higher, representing around **30% of Dutch national income**."

http://www.platformwiskunde.nl/home_deloitte_rapport.htm

<http://www.platformwiskunde.nl/files/documenten/Deloitte%20rapport%2020140115%20Mathematical%20sciences.pdf>

(30) Education economics, VOR division BOO, VOR division O & S

In economics, everything hangs together.

EENEE is the European network for **education economics**,
<http://www.eenee.de/eeneeHome/EENEE/Mandate.html>.

It is a serious option for the boards of VOR and institutes of training of teachers **to invite these economists** to help resolve the issue presented in this letter (like focusing on the creation of SSI).

The following comments may be helpful to see the relevance of economic science. There are various branches within education economics, and an invitation to help is better directed at the right branch.

(This letter also addresses trainers of *teachers of economics*. It has the advice for all addressees to involve *education economists* in resolving a key problem in the *political economy* of mathematics and its education. This shouldn't be too difficult to grasp.)

(A) *Elegance with Substance* (2009, 2015) has three subtitles, that refer to *Building*, *didactics* and *political economy (governance)* <http://thomascool.eu/Papers/Math/Index.html>

- Mathematics and its education designed for Ladies and Gentlemen
- What is wrong with mathematics education and how it can be righted
- On the political economy of mathematics and its education

My branch of education economics is **political economy** and **institutional economics of education**. (a) The argument, that the Simon Stevin Institute resolves the power void in the monopsony market, is an institutional argument. (b) The argument, that mathematicians are trained for abstraction and enter markets of empirical science that they are not qualified for (like financial products or education or voting theory), is both institutional and relevant for the particular fields. (E.g: For financial products one will speak about a blind spot for market risks. For education one will speak about a didactics blind spot.)

<https://boycottholland.wordpress.com/2015/10/31/the-power-void-in-mathematics-education>

<http://www.eenee.de/eeneeHome/Economics-of-Education/Topics/9.html>

http://vorsite.nl/nl/divisies-en-themagroepen/beleid_en_organisatie.html

"De **Divisie BOO** is georganiseerd rond twee vragen:

- 1 Hoe is beleid en organisatie van het onderwijs te verklaren en te verbeteren?
- 2 Hoe is de bijdrage van beleid en organisatie aan educatieve processen te verklaren en te verbeteren?"

(B) A more traditional branch of **education economics** looks at the rate of return of schooling. For this, my analysis on unemployment is relevant. In my analysis it are institutional arrangements on taxes and social security that cause mass unemployment at the low productivity level of the job market, whence **schooling would be ineffective** for jobs.

I assume that you are non-economists, and hence let me refer to a book written for the general public: <http://thomascool.eu/SvHG/DenS/Index.html>

This insight would be relevant for **VOR division O & S**.

http://vorsite.nl/nl/divisies-en-themagroepen/onderwijs_en_samenleving.html

"Binnen de Divisie Onderwijs en Samenleving gaat de aandacht uit naar vragen over de relatie tussen onderwijs en maatschappelijke omgeving. De divisie acht met name het aspect van de ongelijkheid een belangrijk onderdeel van de maatschappelijke omgeving en stelt zich tot doel om de theorievorming en het onderzoek rond dit aspect te bevorderen."

<http://www.eenee.de/eeneeHome/Economics-of-Education/Topics/1.html>

<https://pseudoerasmus.com/2015/06/15/education-econ-growth>

(C) I worked at the Dutch **Central Planning Bureau** in 1982-1991. There can be said more on this, but let me refer to what the colleagues there currently do on **education economics**, in particular w.r.t. mathematics education:

<http://thomascool.eu/Thomas/Nederlands/Wetenschap/Artikelen/2011-07-12-Colignatus-Wiskunde-CPB.html>

(D) There are economists who have analyses on technology and globalisation. For **non-economists** these analyses become **narratives**. In the discussion about "21st century skills" and Onderwijs2032.nl there are **non-economists** who copy such narratives.

There is **RME ideologue (non-scientist) Koeno Gravemeijer**:

- he doesn't acknowledge the empirical evidence that RME has failed
- he doesn't acknowledge that economists who he refers to should answer to my analysis

- he uses this *selective* economics narrative on "21st century skills" to **re-introduce RME**.

<http://www.wiskundebrief.nl/724.htm#6>

<https://boycottholland.wordpress.com/2015/12/08/computer-algebra-is-a-revolution-but-21st-century-skills-q>

(E) Fellow-econometrician Lex Borghans was quoted in an article in NRC-Handelsblad about Onderwijs2032.nl, and this caused me to write him this letter:

<http://thomascool.eu/Papers/AardigeGetallen/2015-09-24-Brief-aan-Lex-Borghans.html>

Borghans has replied that he is involved in another branch of education economics and that he doesn't know yet about other education economists who might help out. (Economists researchers tend to be liberal and supportive but there are limits. Bureaucrat economists tend to be bureaucrats first of all.)

(31) International: IMU / ICMI

IMU / ICMI has a **Hans Freudenthal Award** for contributions to MER. Freudenthal is advertised as MER but he was RM who only hoped to do MER. Also, Freudenthal (1905-1990) committed fraud w.r.t. the work by Pierre van Hiele (1909-2010). ICMI hasn't responded.

<https://boycottholland.wordpress.com/2014/09/02/for-imu-icmi-integrity-of-science-in-dutch-research-in-didactics-of-mathematics>

Jill Adler receive(d) the Hans Freudenthal Award for 2015, and she hasn't responded (I presume in shock) when I informed her about Freudenthal's fraud.

<http://www.mathunion.org/icmi/activities/awards/the-hans-freudenthal-medal-for-2015>

(32) International: Abraham Arcavi and the loss of 25 euros, time and hope

When **Abraham Arcavi** (MSc 1976) was in Holland in 2011, I attended the symposium, we spoke, and since he showed an interest I gave him a copy of COTP to give a reaction. It isn't just that some people consider it rude to refuse, when given a book, so that they accept out of politeness. On 2011-12-13 he is back home and confirms the positive intent: "I will read it soon". Arcavi wrote on "symbol sense" and he should recognise the **paradigm shift** in COTP.

<http://www.fi.uu.nl/fisme/nl/projecten/minisymposiumalgebraict/Arcavi1994FLM.pdf>

On 2012-05-17 he writes: "thanks for sharing and for you kind invitation to react. I am afraid I have to decline, I get many requests to read materials and to react, and it is impossible for me to keep up with them given the many duties to which I am committed. My apologies." It may be that he **just forgot** about our agreement, or it may be a polite way of avoiding giving a reason for rejection, or whatever. Who is to know ?

- One cannot adjust the $\{3 + \frac{1}{2}, 1\}$ score since there is no explicit statement, see (17).
- My position is that I feel **set back in euros, time and hope**, for I am not in a position to hand out hardcopies for non-results.
- Recall the same maltreatment by **Wil Schilders** (director PWN) of agreeing to read a book, accepting a copy (another 25 euros), and no follow up. It isn't just inconsiderate, it is unprofessional, or deliberate sabotage. Schilders cannot quite refer to bad memory, for I reminded him, and he has an official position at PWN and wasn't a guest.

(33) International: USA Common Core State Standards – Mathematics

There is this link:

<https://boycottholland.wordpress.com/2016/03/22/looking-beyond-the-ccss-m>

(34) Some other summary statements

Composing this letter generated some **reformulations** of the same matter. There are good reasons to delete them, but it also makes sense to keep them, since the different phrasing may help understanding. Redundancy helps. Points for you to consider are:

- Mathematics doesn't merely concern some methods w.r.t. number and space. Mathematics has a **special position** in the development of rational thought and psychological self-image. This is important for **education and pedagogy in general**. See my letter to NRO.
- There is the distinction between **research mathematics** (RM) and **mathematics education research** (MER). You are not required to second-guess mathematicians in their research. Required for you is only math competence at the level of highschool or matricola, and when there are doubts then mathematicians or math teachers can explain the argument by means of clear formulas (unless they appear to be "hostile witnesses"). VOR is relevant for education research in general. Perhaps I should have joined VOR in 2007 but hopefully you understand that time and other means have been lacking.
- There are obvious links between MER and other research in education. One element that brought me to the VOR website is the observation that psychometricians have been mishandling tests on arithmetic ("rekentoets"), see <http://thomascool.eu/Papers/AardigeGetallen/2016-01-17-Meta-opmerkingen-over-psychologie-en-wiskunde.pdf>
<http://thomascool.eu/Papers/AardigeGetallen/2016-02-10-Basisprobleem-in-pedagogie-onderwijs-en-didactiek-van-wiskunde.pdf>
<http://thomascool.eu/Papers/AardigeGetallen/2016-01-31-Enkele-emails-rekentoets-psychometrie.pdf>
<http://thomascool.eu/Papers/AardigeGetallen/2016-03-09-Visie-NVWV-bestuur-op-de-rekentoets-klopt-niet.pdf>
- The training of teachers of physics, biology, economics, and so on, will also contain some discussion of the role of mathematics within the own courses. Education in these fields has benefitted from 5000 years of development of mathematics but has been suffering from 5000 years distortion in the education in mathematics as well. What has been happening in these last 8 years since 2008 is a mere drop in this ocean of time but the point is that EWS and COTP provide the proper diagnosis and scope for treatment.

(35) ELWIER, training of teachers of mathematics

There is the role of ELWIER on the **training of teachers of mathematics**, i.e. the "Expertise center for training of teachers in mathematic and arithmetic". <http://www.fi.uu.nl/wordpress> and http://www.fisme.science.uu.nl/wordpress/?page_id=69

(A) Appearances can be deceiving or **is ELWIER dominated by FHCRMI** ? There is for example this Alert 27, of June 22 2012. <http://www.fisme.science.uu.nl/wordpress/?p=525> They seem to have good connections with **subsidy providers** at the Ministry of Education.

QUOTE

Alert 27 – ELWIER netwerken 2012-2013
juni 22nd, 2012 by admin

Zoals wij al eerder berichtten (zie Alert 23, n.a.v. bijeenkomst 15-maart-2012) is het kernteam van ELWIER (**Paul Drijvers** [FHCRMI], **Ronald Keijzer** [stationed at FHCRMI], **Ton Konings**, **Vincent Jonker** [FHCRMI], in afstemming met **Harrie Eijkelhof** [Physics education, director FHCRMI 2011-2014], Ecent) op zoek gegaan naar een constructie voor verduurzaming.

Per 1 augustus 2012 stopt de subsidie van OCW, maar op 15 maart kregen wij veel bijval voor het construeren van een landelijk netwerk voor pabo, 2e en 1e graads voor de gewenste continuering. In feite worden daarmee bestaande netwerken gecontinueerd, maar wordt ook ingebouwd dat afstemming zal plaatsvinden, o.a.

door het voortzetten van een conferentie-reeks (elwier conferenties in 2008, 2010, 2012, en in principe dus ook in 2014 e.v.). Per deelgebied zullen de netwerken ook eigen bijeenkomsten/conferenties blijven organiseren, en wordt de afstemming met Ecent (en andere expertisecentra, zoals Expertisecentrum LeoNed) nadrukkelijker gezocht.

Thans willen wij weten van docenten en opleidingsmanagers of per hogeschool/universiteit tijd kan worden gereserveerd voor participatie in deze netwerken.

In het verslag van 15-3-2012 (kunt u downloaden) is te lezen hoe een en ander momenteel is vormgegeven (omvang, werkgebieden). Vervolgens willen wij u vragen bij belangstelling de Online inventarisatie in te vullen.

Eind augustus/ begin september zullen we dan de volgende stap zetten. Wij houden u daarvan op de hoogte.

UNQUOTE

(B) I presume that they do not use EWS and COTP. I write about didactics but am no official trainer of teachers, whence there is no official reason for them to invite me to partake in their discussion. Trainers of other fields than mathematics should be aware that ELWIER highly likely is blocking information. In 2011 I informed ELWIER that COTP was available, and I haven't heard again. Of course, since **Jeroen Spandaw** is a trainer, they might argue that the book got attention. But, can they really neglect my protest against the misrepresentation and slander ? What are they training for ?

QUOTE

Date: Tue, 31 May 2011 [adapted for the change of website]

To: m.wintermans [at] uu.nl [FHCRM!]

From: Thomas Cool / Thomas Colignatus

Subject: Boek "Conquest of the Plane" is beschikbaar

Geachte heer, mevrouw Wintermans,

Voor berichten voor Elwier zie ik alleen uw naam staan.

"Conquest of the Plane" is nu beschikbaar als printing-on-demand bij de American Book Center (op hun Espresso Book Machine):

<http://thomascool.eu/Papers/COTP/Index.html>

<http://thomascool.eu/Papers/COTP/ConquestOfThePlane.pdf>

<http://www.abc.nl/search/detailed.php?isbn=9789080477469&valuta=g>

Lezing is zeer aan te bevelen voor opleiders van PABO tot VO. Eventueel kan een van de medewerkers een recensie plaatsen ?

Met vriendelijke groet,

Thomas Cool / Thomas Colignatus

UNQUOTE

(C) The ELWIER 2016 conference on May 18 costs EUR 95 (paid by their employers) and the plenary speech will be given by **Marc de Vries**, the supervisor of **Jeroen Spandaw** who allowed Spandaw his misrepresentation and slander on COTP. At the end of the conference, there is the option to go and listen to the oration by **Wouter van Joolingen**, science director of FHCRM. Will Van Joolingen inform us that RME has failed, that Freudenthal committed fraud, and that FHCRM will be detached from university ? <http://www.fi.uu.nl/ecentelwier>

(36) VELON, VELOV, associations of trainers of teachers

VELON is the association of teacher trainers in NL. <http://www.lerarenopleider.nl/velon> They have this webpage in English: <http://www.lerarenopleider.nl/velon/profession-teacher-educator> VELOV is the sister in Flanders. <https://velov.wordpress.com>

VELON-VELOV jointly have this journal: <https://velov.wordpress.com/tijdschrift-voor-lerarenopleiders>

In February 2012 I submitted this article to the VELON journal.
<http://thomascool.eu/Papers/Math/2012-02-02-ColignatusMbtWindels.pdf>

Manager Mathilde van Vliet asked about my background and whether the article was a reaction on Windels. I informed her about my background and clarified that I already had made the analysis but that I liked Windels's article so that I included a reaction. I never heard again. <http://www.lerarenopleider.nl/velon/over-velon/bureau>

(37) Skepsis and Skepter

Skepsis is a Dutch association of skepticals, and Skepter is their journal, now with chief editor Hans van Maanen (science journalist), <http://skepsis.nl>. Like Gardner above, they "tackle" extraordinary claims, pseudo-science, dubious therapies and paranormal ideas.

One wonders what they think about the phenomenon that Freudenthal's "realistic mathematics education" (RME) has been exposed as being like astrology or homeopathy, see (6). Indeed, a main editor is Jan Willem Nienhuys, a mathematician who wrote his thesis under supervision of Freudenthal (but not on RME), and who lectured on math at TUE. When I informed Nienhuys of my discovery in 2014 about Freudenthal's fraud w.r.t. the work by Van Hiele, there was non-response. This is a pity, since it might be helpful when people look at the evidence who have personal recollections.

In 2007, I suggested Skepter to write a review of ALOE, that gives a fine development of logic, and debunks some nonsense that academic logicians and science journalists tell about the liar paradox and Gödel's Theorems. Unfortunately, Nienhuys was reluctant. He stated a too simple summary of the upshot of these theorems. I found it too risky to send a copy without the guarantee of a serious review.

In 2010, I sent in this article to Skepter, but it wasn't accepted.
<http://thomascool.eu/Papers/Drgtpe/Crisis-2007plus/2010-02-07-Natuurkundigen.pdf>

There is also the issue of "The simple mathematics of Jesus" (2012):
<https://boycottholland.wordpress.com/2015/02/02/the-closed-dutch-mind-on-jesus-too>

(38) Example: quadratic function (gravity, quadratic cost)

Restated from above: It will be useful to give some examples, so that other fields may get an idea what the discussion may be about. Giving an example is risky since readers might misread this. My main point is not that these examples must be implemented, but my main point is that these issues require decent research and an environment of a Simon Stevin Institute (SSI) for resolution. Giving an example may have the effect of a discussion of the pro's and con's of that very example. This however is not the intention.

In physics, location, speed and acceleration are modeled using a quadratic function. In economics there may be a quadratic function for costs, and one determines its minimum. Thus the **quadratic function** is important for more fields taught at highschool.

- Teachers of other fields might suppose that the mathematics curriculum *supports* the use of quadratic functions in those other fields.

- This however is only partly true. In mathematics education, the focus is not upon **student understanding** of the **quadratic function**, but the focus is on the mathematical **theory of polynomials**, of which the quadratic function is treated as a special case.

One might argue that ME would have some leeway to introduce their *own* topics of interest. ME is not *only a service-for-others*. Some students might later study mathematics. One might argue that it is up to MER to determine the best didactics.

- When MER selects the current focus on a particular theory then other teachers and researchers might think: "They would have didactic reasons to do so."
- This however is not quite true. There are no developed didactic reasons. It is mere tradition, derived from some theory in mathematics. As far as I know – though with limited resources – there is no proper discussion and empirical testing as to what didactics on quadratic functions works best.
- It is more likely that the **abstract bias** on the theory of polynomials generates **crummy didactics**, for both the quadratic function and polynomials in general.
- One might argue that modern calculators quickly draw a parabola and find vertex and zeros, but the objective still would be that students understand how and why, and are also aware of what they know.

This issue is recent, and there are no responses yet. Relevant links are:

- The mathematics teachers newsletter of May 8 2016:
<http://www.wiskundebrief.nl/738.htm#5> (in Dutch)
- My proposal for re-engineering the didactics of quadratic equations.
(a) <https://boycottholland.wordpress.com/2016/04/24/teaching-quadratic-functions-re-engineered>
(b) <https://boycottholland.wordpress.com/2016/05/01/a-long-road-with-a-recipe>
- A traditional approach.
<http://www.mathcentre.ac.uk/resources/uploaded/mc-ty-quadeqns-2009-1.pdf>
- An approach somewhere in the middle, neither traditional neither as developed.
<http://www.funken.tu-dortmund.de/cms/media/download/Symposium/Funken+Symposium+200115.pdf>

(39) Example: derivatives (motion, budget optimality)

Restated from above: It will be useful to give some examples, so that other fields may get an idea what the discussion may be about. Giving an example is risky since readers might misread this. My main point is not that these examples must be implemented, but my main point is that these issues require decent research and an environment of a Simon Stevin Institute (SSI) for resolution. Giving an example may have the effect of a discussion of the pro's and con's of that very example. This however is not the intention.

In physics, location, speed and acceleration are related by derivatives. In economics budget optimality is determined by derivatives. Thus derivatives are important for more fields taught at highschool.

The didactic situation is this:

- Lawyer Fermat, natural philosopher Newton and "polymath" Leibniz developed the theory of **infinitesimals**.¹ Critique, also by bishop Berkeley, caused Cauchy to develop the form with **limits**. Weierstrasz developed the form with predicate logic on **epsilon and delta**. There is also **calculus** that only uses the general rules (derived from the earlier).
- For highschool, ME prefers Cauchy's form with limits.

¹ I understand that Newton used his new method to find his laws of motion, but published the *Philosophiæ Naturalis Principia Mathematica* using Euclidean geometry since that was the standard of publication (not "science") at that time. See David Bodanis on Émilie du Châtelet.

- Weierstrasz was acquainted with Cantor who started set theory. However, set theory became much more developed later on. In 2007+ it appeared possible to develop high school differential analysis also in set theory. And this is much more accessible. The approach was presented for the first time in ALOE 2007, 9 years ago, which is a book on logic, and the issue is treated as an issue in logic and algebra rather than as an issue in numbers or space.
- This latter approach is called the **algebraic** approach to the derivative.
- It is a confusion that one would need infinitesimals, limits or epsilons and deltas to develop derivatives and integrals for functions that are used in highschool.

First there is this definition of the **dynamic quotient** (not using H or D):

Let y / x be as commonly used, and the dynamic quotient $y // x$ be the following process or program:

$y // x \equiv \{ y / x, \text{ unless } x \text{ is a variable, and then: assume } x \neq 0, \text{ simplify the expression } y / x, \text{ declare the result valid also for the domain extension } x = 0 \}.$

A quick test of understanding of the definition is what $(w - w) // (w - w)$ results into. Clearly in the definition y stands for the numerator and x stands for the denominator. Numerator and denominator are variables but of course these can be expressions. Thus we use $z = w - w$ and find $z // z$. In general $x // x = 1$ but only for variables x and it turns out that $z = 0$, so that $z // z = 0 // 0 = 0 / 0 = \text{Indeterminate}.$

Then check p17 of my presentation of the NVvW 2013 study day, workshop D5:

<http://thomascool.eu/Papers/COTP/2013-11-11-ColignatusStudiedagNVvW-English.pdf>

Compare

(a) $\lim_{\Delta x \rightarrow 0} \frac{\Delta f}{\Delta x}$

(b) $\text{set}_{\Delta x=0} \Delta f // \Delta x$

(c) $\{\Delta f // \Delta x, \text{ set } \Delta x = 0\}$

clarity in the manipulations in algebra and domain

clarity in the order of the manipulations

This result means for didactics of mathematics:

1. Division *itself* is clarified for cases when the denominator threatens to be zero. With a better distinction between "simplifying an expression" and "division".
2. Derivatives can be introduced without limits (which remain a relevant concept).²
3. Derivatives can be introduced simpler and sooner. (The traditional approach starts with tangents, but COTP starts with surface and integral, and the derivative then follows.)
4. Derivatives enhance notions of algebra, functions, domains and ranges. Attention actually shifts to that, also to conditions when the domain can be manipulated.
5. Derivatives can be introduced with (final) clarity about what they are. The derivative is defined traditionally for $\Delta x = 0$ with the outcome for $\Delta x \rightarrow 0$, but the limit-expression doesn't show this explicitly. In the algebraic approach we directly substitute $\Delta x = 0$. The

² Dutch: "Bij de overgang van Wiskunde B1,2 naar B zijn limieten eigenlijk al uit het programma verdwenen. Zie www.nieuwarchief.nl/serie5/pdf/naw5-2002-03-1-070.pdf en <http://www.slo.nl/organisatie/inDeMedia/2008/S45C-108070809591.pdf>, Jenneke Krüger, Euclides 83-8, p375: "Hoewel limieten weer in een subdomein opgenomen zijn is het niet de bedoeling hier een heel uitgebreid onderdeel van te maken. De limiet wordt beschouwd als een noodzakelijk concept bij de introductie van afgeleiden en bij bestudering van het asymptotisch gedrag van functies."

approach actually recodes what already is done in "taking the limit", and relies on the properties of functions used in highschool.

6. When **other fields** like physics and economics can use derivatives with more ease, then they provide areas of application (contexts), and mathematics education has more scope to develop mathematical thinking (assumptions, proofs, generalisations, and so on).

For example, alpha students in Dutch highschool (grade 11, age 16-17) are served with notions of speed and acceleration for their driver's license, and might need derivatives later if they would study economics. How is this need served? The presentation in a math textbook (**figure**: on the left: table of contents p4) is targeted at average differences, and at approaching a slope in a graph by taking ever smaller differences. The introduction is visual, with a particular type of diagram (§2.1) that they are likely never to see again (and neither beta students unless they become math teachers). (The book is much used so that the diagram potentially might serve a didactic purpose, but I think that it really should be tested.) Numerical examples (e.g. the figure on the right, p45) are given of differences and their ratios, with the idea that ever smaller differences converge to a limit ratio. The approach implies the use of limits, and there is a focus on *numbers* and *graphs*. There is "guided reinvention", with the idea that these stepping stones are required to understand the derivative.

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	Test jezelf	56

"Moderne Wiskunde, vwo A/C deel 2",
Wolters-Noordhoff, 2008. Above: p4. Right: p45.

Voorbeeld

Bereken de helling in het punt $(-2, -8)$ van de grafiek van de functie $k(u) = u^3$
Kies een klein interval rond $u = -2$, bijvoorbeeld $[-2; -1,999]$

u	-2	-1,999
k	-8	-7,988

Δu
 Δk

$$\frac{\Delta k}{\Delta u} = \frac{-7,988 - (-8)}{0,001} = 12$$

De helling in $(-2, -8)$ is vermoedelijk 12.

Some points of various relevance are:

- The example in the figure on the right happens to contain the error that while the function has cause u and effect k , the formula for the difference quotient still uses t and h .
- Observe that the table has the cause in the top row while the difference quotient has the cause in the denominator: whence there is a visual switch in top / down.
- Students at this stage on p45 haven't had the derivative yet, and can only approximate the slope. The question reads "calculate the slope in *the graph of the function*" which comes from a notion that *functions are perfect* and *graphs are humanly drawn and would be approximate*, while the reference to approximation only enters explicitly in the answer. The subtlety may be lost to many students, and I actually agree with them and protest that only drawings are approximate and that a graph is the idea of a perfect display (otherwise different students can't draw the same graph).
- It is up to the teacher to discuss Parmenides's paradox that velocity is an average and that at a point in time there is no change of time, whence there cannot be such velocity. (Thus momentum is a better notion, and instantaneous velocity is a counterfactual, that would follow the tangent if there were no force applied. A physicist relies on math, see <http://physics.ucsc.edu/~josh/6A/book/notes/node14.html>.)

For the new algebraic approach, the notion of difference remains relevant, because the derivative is found (while assuming that the function has been given) by setting the causal difference to zero. Approximation and limit are not relevant any more, and *algebra* becomes

more important, whence there would be more training on competence in algebra. It remains important to discuss how to make and interpret graphs, but this is a separate issue. In this case, estimating a slope by means of a drawing is an *application* of what has been learned here *earlier*. (The phrase "guided reinvention" is Freudenthal's misrepresentation of Van Hiele's method from concrete to abstract. Freudenthal wants to rig the stage so that students can be like Newton, Leibniz and Cauchy and converge on rediscovering the accurate mathematical formulation of the derivative, which is unrealistic. Should students not be able to discover the algebraic approach too, that mathematicians didn't find themselves yet ?)

The dynamic quotient and algebraic approach to the derivative can be done in highschool.

- COTP provides a **proof of concept** for the didactics in highschool and matricula.
- Obviously implementation research is required, but this needs the environment of the Simon Stevin Institute.
- My position is that the approach is **obviously better**. RM who don't agree have a bad mathematical intuition, more so than a closed mind, but likely both. Still, RM will have proper questions about aspects that I am not interested in, since I am no RM. This paper provides a bridge for RM so that they can start their theoretical discussion: <http://thomascool.eu/Papers/Math/2014-09-08-Sky-Field-Meadow.pdf> In this paper I thank **Jan Bergstra**. This does not mean that he agrees with this paper. In fact, he commits a breach of integrity of science. See (49).

Some responses have been:

- The most relevant (and positive) response came from **Richard Gill**, but he is not in ME and MER, see here: <http://www.nieuwarchief.nl/serie5/pdf/naw5-2012-13-1-064.pdf> (In email exchange **Jan Bergstra** informally challenged this review, but this is misrepresentation. Bergstra has not retracted the challenge, and since there is no way of knowing whether this continues e.g. as gossip: see here for this exchange. <http://thomascool.eu/Papers/Math/JB/2016-05-09-Emails-TC-JB-2014-KNAW-LOWI.pdf>)
- The misrepresentation by **Jeroen Spandaw**, mentioned in (21), is that **he doesn't present the algebraic method**. Readers of his "review" are not informed about the invention. Instead, he starts explaining the traditional approach by Weierstrasz, **as if I would not understand it**. (And as if I didn't get it in the courses in analysis in Groningen, together with students of mathematics, physics and astronomy.) Spandaw's misrepresentation is devious and slanderous, for the readership only learns that there would be "severe criticism" ("smoke") but they are not informed what it is about (fire or fog ?). Spandaw is a trainer of teachers (ME or MER), and it would be hard to believe that he would not have **intent**, or that he would not know what he is doing. (Apparently Spandaw's supervisor **Marc de Vries** allows Spandaw to maltreat COTP and the algebraic approach to the derivative, as if it would not be relevant for TU Delft or engineers in general. But a more fundamental problem might be that TU Delft has **no developed faculty on research on education**.)
- In Dutch there is the following paper of 2012, offered to **TD-Beta**, another journal of FHCRI, now gone too. It was rejected with **real silly** argumentation (now included in the pdf). This means that teachers of physics and researchers in that realm were withheld key information. <http://thomascool.eu/Thomas/Nederlands/Wetenschap/Artikelen/2012-06-14-EenWereldontdekking-ook-voor-beta.pdf> (All in favour of peer review, raise your hands.)

(40) VOR's division: DSO Beta en Techniek

I advise the board of VOR to call for testimony from member-researchers, but to beware of "hostile witnesses". https://en.wikipedia.org/wiki/Hostile_witness

VOR is divided in divisions, <http://www.vorsite.nl>, and one of those is "DSO Beta en Techniek". Apparently mathematics is considered part of Beta, and I would prefer to see that there are also gamma sciences (that use mathematics). See A.D. de Groot and: <https://boycottholland.wordpress.com/2015/10/02/pierre-van-hiele-and-gerald-goldin-2>

"Daarbij wordt 'Bèta en Techniek' breed opgevat: natuurwetenschappen, wiskunde, informatica en techniek. De Themagroep ziet haar werk nadrukkelijk tegen de achtergrond van onder andere de maatschappelijke positie van de B&T-vakken en in het bijzonder de lage animo voor en studeerbaarheid van B&T-onderwijs."

The 2016-05-02 website shows this board, and I include some comments.

- dr. R. (Ruurd) Taconis, ESoE, Technische Universiteit Eindhoven (voorz.). Taconis is likely to be interested in the algebraic approach to the derivative, given the title of his thesis 1995 (<https://pure.tue.nl/ws/files/1536583/439275.pdf>). Of his career of 30 years he spent 2 years at FHCRMI / CDTV and 3 + 7 / 12 years at IVLOS (UU). At TUE he collaborates with **RME ideologue Koeno Gravemeijer**.
 - Apparently he studied RME but didn't see the fraud by Freudenthal.
 - Does he accept the evidential failure of RME ?
 - What does he think about the critique that Gravemeijer is silent about the failure of RME and tries to re-introduce it via the slogans of "21st century skills", <https://boycottholland.wordpress.com/2015/12/08/computer-algebra-is-a-revolution-but-21st-century-skills-q>.
 - At TUE there are also **Wil Schilders** (director PWN) and **Mark Peletier** (slandering at BON). Is Taconis willing to ask them, and insist, that they correct misconduct ?
- prof. dr. F.P. (Bert) Zwaneveld, Emeritus hoogleraar van het Ruud de Moor Centrum (OU) (secre., plaatsv. voorz.). He is co-editor of the "Handboek Wiskundendidactiek", which should be corrected, check <http://thomascool.eu/Papers/BHRM/2015-10-28-Malconduct-Roorda-Daemen-Drijvers.pdf>. Why doesn't Zwaneveld correct **Spandaw, Roorda, Daemen** and **Drijvers** ?
- prof. dr. M.J. (**Marc**) **de Vries**, Technische Universiteit Delft (penningmeester). He is head of the department where **Jeroen Spandaw** is employed, and De Vries refused to do anything (even read COTP to see what the issue is about). De Vries is also professor in "Reformational Philosophy" (Calvin). He "should" be interested in my book "The simple mathematics of Jesus" (SMOJ) (2012) <http://thomascool.eu/Papers/SMOJ/Index.html>
- dr. **N.C. (Nellie) Verhoef**, Universiteit Twente. See (41)
- dr. M.C.P.J. (Christine) Knippels, FIsme, Universiteit Utrecht, again **FHCRMI**. I have no experience with Knippels, and only observe that she is at FHCRMI so that these standard questions pop up:
 - Does he accept the evidential failure of RME ?
 - What does she think about the breaches of integrity by other FHCRMI employees ?
 - Did she observe the fraud by Freudenthal ? What does she think about the evidence ?
- dr. J. (Hanno) van Keulen, Windesheim Flevoland. MSc chemistry in **Utrecht University**, teaching degree there, a period in Delft, thesis UU in chemistry education research 1995, programme leader at teacher training school (UU / IVLOS / COL) for beta education. Wrote some papers with **Koeno Gravemeijer**, and helped develop for elementary school a booklet for research by pupils, with a "bridge" between math and science and technology. <http://www.fisme.science.uu.nl/experimenteel/ewt/index.php> He criticises the emphasis on language and arithmetic, and prefers also to see science and technology, but doesn't mention the relevance of music and dance. He wants to teach science and technology in meaningful contexts, and thus it seems that he prefers RME but perhaps he doesn't. <http://www.didactiefonline.nl/component/content/article?id=6382> behind paywall ! <https://www.platformbetatechniek.nl/media/files/publicaties/Wetenschap%20en%20techniek%20Ijkpunten%20voor%20een%20domein%20in%20onwikkeling%20-%20Hanno%20van%20Keulen.pdf>

Google finds a book *Professional Development for Primary Teachers in Science and Technology*, Sense Publishers 2011, edited by **Marc de Vries** (supervisor of **Jeroen Spandaw**), **Hanno van Keulen**, Sylvia Peters, and **Juliette Walma van der Molen** (supervisor of **Nellie Verhoef**).

https://books.google.nl/books?id=NWFLyGF4zHYC&pg=PR8&lpg=PR8&dq=Professional+Development+for+Primary+Teachers+in+Science+and+Technology&source=bl&ots=xnei6bnNgP&sig=-C-yS84bUJihHEI2NPj6Yk0t7gc&hl=en&sa=X&ved=0ahUKEwj0_CO1r7MAhUqLcAKHeBjAuoQ

[6AEIKDAC#v=onepage&q=Professional%20Development%20for%20Primary%20Teachers%20in%20Science%20and%20Technology&f=false](https://www.researchgate.net/publication/260141166/figure/fig1/figure-fig1/1519022222222/6AEIKDAC#v=onepage&q=Professional%20Development%20for%20Primary%20Teachers%20in%20Science%20and%20Technology&f=false)

Interestingly (I am not qualified for primary education), Wynne Harlen & Pierre Léna state on p3 (fitting the notion that learning goes from concrete to abstract, and from vague to precise):

Science here means the natural sciences, and does not include mathematics. Although modern science would not exist without mathematics, it is fortunate that learning science at the primary level can be pursued without the need of formulae, using a great many qualitative observations with only a modest use of quantitative data. This does not mean that many of the inquiry principles developed in this book could not equally inspire mathematics education (Artigue 2010), nor that science and mathematics should be taught entirely independently.

(41) Nellie Verhoef and David Tall

Nellie Verhoef has a very curious role.

(A) David Tall

I went to ORD 2010 to meet David Tall and listen to Verhoef on Lesson Study, see (11). One result was this comment in NAW.

<http://www.nieuwarchief.nl/serie5/pdf/naw5-2012-13-4-262.pdf>

In 2014 I discovered that Hans Freudenthal had abused the work by Pierre van Hiele, and wondered what David Tall had to say on this, given a remark that he had made when we met at ORD. This explains part of this text:

<https://boycottholland.wordpress.com/2014/07/06/hans-freudenthal-s-fraud>

Getting the facts right, in 2014, caused me to ask Harrie Broekman the question who had been Pierre van Hiele's promotor (it was Freudenthal indeed). Curiously, Verhoef sent Broekman this message, see "Intermezzo Verhoef", page 33-36

<http://thomascool.eu/Papers/AardigeGetallen/2016-01-31-Enkele-emails-rekentoets-psychometrie.pdf>

QUOTE

Date: Tue, 19 Aug 2014 12:27:48 +0000

From: N.C.Verhoef

To: H.G.B.Broekman, Thomas Cool

Subject: RE: Technische vraag t.a.v. promoties Van Hieles en hun promotores

Harrie, onthoud je van deze man! David is er gestoord van geworden!

Groetjes, Nellie

UNQUOTE

This is pure misrepresentation and slander. It doesn't help that Verhoef doesn't give an answer to my **request for more information** (see the "intermezzo"), which might have allowed to discover the source of the problem. For Verhoef, I and my work don't exist, and other people must know this too. (This might be something for the VOR code of conduct ?)

Apparently, Verhoef has been Tall's Dutch contact and she must have provided him with translations and other information. Most likely this has been disinformation.

1. Verhoef claims to be an expert in MER, but she did not discover that Freudenthal abused the work by Van Hiele. <http://www.wiskundebrief.nl/718.htm#7>
2. Tall claims to be an expert in MER, but did not discover that Freudenthal abused the work by Van Hiele. In fact, Tall claims that he **himself** discovered in 2010, what Freudenthal

already claimed in 1987, and what Freudenthal stole from Van Hiele 1957. (Tall's thoughts in 2010 were triggered because of thinking of Van Hiele when he passed away. Tall thinks that there is evidence that Van Hiele didn't see it (what Van Hiele actually claimed in 1957), but Tall misreads some lines, and neglects the other evidence.)

<https://boycottholland.wordpress.com/2015/10/15/pierre-van-hiele-and-annie-selden>

3. I have no idea what information Verhoef has given tot Tall (on Freudenthal, on Van Hiele, on me).
4. When I present the evidence, there is no guarantee that Verhoef will consider it, see above email. The evidence: <http://arxiv.org/abs/1408.1930>
5. There is the sick development w.r.t. the thesis by **La Bastide – Van Gemert**: <http://thomascool.eu/Papers/AardigeGetallen/2015-10-23-Malconduct-UMCG-emails-Colignatus-LaBastide-Vertrouwenspersoon.pdf>
6. **Michiel Doorman** (at FHCRMI), in referring to Freudenthal and not to the original source Van Hiele, also uses this erroneous thesis by La Bastide – Van Gemert, <http://thomascool.eu/Papers/AardigeGetallen/2016-03-11-NVVW-is-een-ernstig-zieke-vereniging.pdf>

My suggestion to VOR and other researchers is to agree with me: that it is **important that Verhoef provides clarity about what she told to Tall**. Like the Spandaw-case, this might have a **pivotal effect** on understanding what has been happening here, which again is important to get further.

(B) This clarity concerns also the subsequent developments. **Nellie Verhoef** participates in:

- a project on analytic geometry, see (42),
- a PWN report on MER, see (42),
- the "Deltaplan Wiskunde" that is presented to the minister of education, see (44).

(C) Pro memori

Verhoef's LinkedIn page states that she graduated in mathematics in Utrecht in 1973 (thus soon to be retired): "My first study focusses on logic, set and proof theory My sub study focusses on mathematics education." (a) It makes one wonder what she would think about ALOE. (b) The subquestion is whether she had been in early contact with RME and what her ideas on that are. I leave this here.

(42) Analytic geometry returns in Dutch highschool

Analytic geometry returns in the mathematics programme for Dutch highschool since 2015. This causes some **re-training** of mathematics teachers. Trainers of teachers at three technical universities of Twente (**Nellie Verhoef**), Eindhoven (**Hans Sterk**) and Delft (**Jeroen Spandaw**) collaborated in a 3TU project to do so, see also workshop B1 at the NVvW annual convention of 2015. <https://www.nvvw.nl/16944/subthema-b-nieuwe-programma-s-havo-vwo>

The subtitle of my book COTP (2011) is: "Using The Economics Pack *Applications of Mathematica* for a didactic primer on Analytic Geometry and Calculus". **A primer is a book to train teachers**. It is a happy circumstance that this book became available in 2011 so that teachers in the period 2011-2015 could use it for (re-) training on these subjects.

However, with Spandaw's misrepresentation and slander and with Verhoef's (further undocumented) negative attitude and slander, there seems little scope for this. It is amazing how small the world can be, but there is a system in the madness.

- I don't know whether COTP is used or not in (re-) training. I presume that it isn't.
- It might be that each has had their own reasons not to adopt COTP or discuss its relevance with me. Spandaw has a documented position. Verhoef might have further undocumented aversion to anything related to me as like the plague. Sterk would likely know about COTP because he is one of the book editors of NAW, and Richard Gill reviewed COTP for NAW, but that doesn't mean that the message really registered.
- These trainers might think that they are competent enough to design a (re-) training course on analytic geometry as it has been traditionally been taught, whence there would

be no perceived need for COTP or other criticism. This is too simple however, because both Spandaw and Verhoef are in **breach of research integrity**, as explained.

- Using combinatorics: I have no statement from either Verhoef or Sterk that they have looked into my protest against Spandaw's "review", or what their findings were.
- I have no statement from either Verhoef or Sterk in which they explicitly refer to Spandaw, with the argument *that they take him on his word* that COTP would be no good, and that they have so much confidence in this, that they can neglect the other information in (17).
- The period 2011-2015 is problematic **anyway** w.r.t. the process for the new programme. <http://thomascool.eu/Papers/Math/2013-02-06-Colignatus-nav-cTWO-Eindrapport.html>

(43) PWN on MER

Verhoef's LinkedIn page states that she is chairman of the **"PWN education research committee"**, but the PWN website distinguishes only education and research and she isn't mentioned there. However, there is a **report on education research**, compiled by a committee that she chaired, March 2014.

- <https://www.linkedin.com/in/nellieverhoef>
- <http://www.platformwiskunde.nl/files/documenten/PWN%20rapport%20onderwijsonderzoeksekscommissie.pdf>

Curious points are:

1. The PWN "mathematics education research experts" agree that NVvW and KWG join forces in PWN, while MER shows that mathematicians have a disastrous influence on ME and MER. **You get math wars and "crackpot interception modes" and crummy "mathematics" and math anxiety.** Contact is natural, but joining forces is counterproductive.
2. There is the **blunt lie** that research in didactics of mathematics is a high priority ("wiskundig-didactisch onderwijsonderzoek een van de onderwerpen die hoog op de agenda van PWN staan", p4). The unstated high priority is **to burke my work** and to slander my person.
3. Obviously the report doesn't refer to my work. **This is clearly biased.** Can PWN "mathematics education research experts" really neglect the $\{3 + \frac{1}{2}, 1\}$ outcome, see (17) ? Observe that PWN claims to speak for the whole RM-ME-MER community, which should come with some **responsibility**. Responsibility isn't rejecting a $\{3 + 2^H, 1\}$ outcome. Am I no part of that community, and doesn't my protest deserve at least a footnote ? Or is this report just a way to spend government subsidies to get more government subsidies ? FHCRMI's principle: the narrative must keep money flowing in, and it is of no importance to do actual scientific research.

Who are these PWN "mathematics education research experts" ? Again, I haven't necessarily studied their work, and mentioning their names and backgrounds isn't intended as judgement. I hope that you allow me trying to understand what is happening here, and a first step is to check who are the committee members, who can explain how this PWN report has been made. Is it a *scientific report* or *only lobbying* ?

1. **Nellie Verhoef**, chairman, see (41).
2. Arthur Bakker, mathematician Amsterdam 1995, teaching degree Amsterdam 1997 (but this need not undo what has gone wrong before on lack of empirical training), thesis 1998-2004 at UU written under supervision of **RME ideologues Koeno Gravemeijer and Jan de Lange**, and experimental psychologist Gellouf Kanselaar (former chair of VOR). A paper on **statistics education** puts RME central <https://pure.tue.nl/ws/files/3119810/Metis218242.pdf>. FHCRMI 2006-now, and SBS at UU 2014-now. <https://www.linkedin.com/in/arthur-bakker-617b9420>
 - It is unclear whether he has acknowledged that RME failed.
 - Apparently Bakker studied RME but didn't discover Freudenthal's fraud. <http://www.fisme.science.uu.nl/staff/arthur>
3. **Paul Drijvers**, mathematician, thesis supervised by **RME ideologue Koeno Gravemeijer**, at FHCRMI, manipulative and disingenuous w.r.t. the "Handboek

Wiskundedidactiek" and its omission to mention the algebraic approach to the derivative.
<http://thomascool.eu/Papers/AardigeGetallen/2016-03-11-NVvW-is-een-ernstig-zieke-vereniging.pdf>

4. **Marian Kollenveld**, at that time in 2014 chairman of sick NVvW, who had allowed the misrepresentations and slander in Euclides by Ger Limpens and Jeroen Spandaw, and the burking of my work on the derivative, see (39), by Roorda & Daemen as authors and Drijvers as editor of the "Handboek Wiskundedidactiek". Kollenveld had to deal with the RME and TME math wars, and called for pacification and collaboration, and objected to my phrasing, but didn't listen to what I said. (She might have gotten in the frame of mind that any criticism would be dangerous to the "peace". But I am no psychologist. But beware of psychologists who make quick observations on psychology without proper research. This is similar to mathematicians stating "this isn't mathematics".)
5. Ton Konings, since 1977 at Institute for training of teachers of junior highschool, HAN (Arnhem-Nijmegen), no more data, <https://www.linkedin.com/in/ton-konings-07593516>
6. And Pro Memori also some advisors.

(44) PWN on "Deltaplan Wiskunde", misleading the minister of Education

<http://thomascool.eu/Papers/AardigeGetallen/2016-03-22-Minister-krijgt-een-misleidend-Deltaplan-Wiskunde.pdf>

QUOTE

From: "Dienstpostbus Burgervragen"

To: Thomas Cool

Subject: Uw e-mail over de aanbieding misleidend Deltaplan Wiskunde aan M

Date: Thu, 14 Apr 2016 12:44:25 +0000

Kenmerk: 915274

Geachte heer Cool,

Hartelijk dank voor uw e-mail van 23 maart 2016 die u stuurde naar het Ministerie van Onderwijs, Cultuur en Wetenschap. Daarin meldt u dat professor Fokkema het Deltaplan Wiskunde aan de minister heeft aangeboden. U bent van mening dat het Deltaplan Wiskunde misleidend is en u legt in uw e-mail gedegen uit waarom. Graag beantwoord ik uw e-mail.

Ik waardeer uw betrokkenheid bij het onderwijs, maar u hebt al eerder antwoord gekregen van het ministerie op uw brief. Met het aanschrijven van de KNAW en de NWO, hebt u de juiste instanties benaderd. Daarmee is uw e-mail afdoende beantwoord en kan ik daar niets meer aan toevoegen.

Met vriendelijke groet,

XYZ

Afdeling Bestuur en Burger

Ministerie van Onderwijs

Date: Wed, 20 Apr 2016 11:02:30 +0200

To: "Dienstpostbus Burgervragen"

From: Thomas Cool / Thomas Colignatus

Subject: Kenmerk: 915274 Re: Uw e-mail over aanbieding misleidend Deltaplan Wiskunde aan M

Geachte mw. XYZ,

Dank voor uw reactie.

U stelt: " u hebt al eerder antwoord gekregen van het ministerie op uw brief ".

Ik ben mij daar niet van bewust. Mijns inziens heb ik nog geen antwoord ontvangen op mijn email van 23 maart 2016 aan het ministerie van OCW.

Kunt u dat eerdere antwoord alsnog aan mij doorsturen ? Of wanneer u ziet dat het inderdaad een misvatting van u is dat het ministerie al antwoord heeft gegeven, dan hoop ik dat het ministerie alsnog antwoord wil geven.

Volledigheidshalve informeer ik u over mijn brief aan NWO / NRO:

<http://thomascool.eu/Papers/Math/2016-04-15-Letter-to-NRO.pdf>

Met vriendelijke groet,

Thomas Cool / Thomas Colignatus
(...) Scheveningen
UNQUOTE

(45) VOR division: ICT

- See *Elegance with Substance* on **Beating the software jungle**.
- <https://boycottholland.wordpress.com/2015/12/08/computer-algebra-is-a-revolution-but-21st-century-skills-q>

(46) VOR division: teachers and training of teachers

VOR has also a division on teachers and training of teachers.

http://www.vorsite.nl/nl/divisies-en-themagroepen/lerarenopleiding_en_leraarsgedrag.html

"De VOR divisie Leraar en Lerarenopleiding (L&L) brengt onderzoekers bijeen die hetzij onderzoek doen naar leraren, hun gedrag, cognities, competenties en hun leren en ontwikkeling; hetzij onderzoek doen naar het opleiden van leraren. Dit omvat het opleiden van leraren in opleidingsinstituten, het opleiden in scholen (de werkplek), maar ook onderzoek naar het gedrag, de cognities en het leren en de ontwikkeling van degenen die leraren opleiden. De divisie heeft bijna 200 leden."

- It would be useful that this group of researchers **confirms** that mathematicians are trained for abstraction and that ME is an empirical issue, and that training of mathematicians for ME or MER may often not undo what has gone wrong in empirical attitude. The evidence is provided by EWS, COTP and CWNN, the failure of RME, the math wars, the "crackpot interception mode", and such.
- Please confirm also to the minister of Education that the "**Deltaplan Wiskunde**" is misleading with respect to this point, see (44).
- I am open to the possibility that L&L makes a study of my "behaviour, cognition, competencies, learning and development", by itself and in the environment of math wars and "crackpot interception mode" and so on.
- I am open to the possibility that L&L makes a study of how my work is being blocked for use in the (re-) training of teachers of mathematics and fields that use mathematics.

(47) My books aren't mathematics books, but mathematicians are not accurate when they would merely state "this isn't mathematics"

My books ALOE, VTFD, EWS, COTP and FMNAI apply mathematics. I am an econometrician and teacher of mathematics. I don't aspire to be a mathematician. These books are not written for mathematicians but for the area of application, with students in mind.

See my explanation that I do applied mathematics. <http://thomascool.eu/Papers/Math/2013-03-26-WAMMWTKAMW.pdf>

It is obvious that one can say about my books "they are not mathematics".

When a **mathematician** says "they are not mathematics" then this becomes tricky however.

Beware of the potential abuse of language and the authority of mathematics.

- A mathematician better aspires at accuracy, which is their profession, and says "*these books haven't been written by a mathematician for mathematicians*".
- When people hear a mathematician stating that something "isn't mathematics", then they might think that it is rubbish. Perhaps such mathematician intends people to think so indeed? But then there is an abuse of language and authority. How can a mathematician judge about a book that doesn't fit his or her profession? For a judgement, the mathematician would need to study the relevant field. This also holds for the empirical science of "mathematics education research" (MER). One would give an argument on content. Stating ex cathedra "it isn't mathematics" is an abuse of language and authority.
- An analogy is that it is okay for Nellie Verhoef to say, see (41), that David Tall "has become mentally disturbed" (Dutch slang "gestoord"), because she is a non-psychologist, and we know how to interpret this. A psychologist would be aware (unlike perhaps mathematicians) how professional authority might have an unintended impact (but some mathematicians abuse this), and rather say that David Tall "got upset" or the like. (And hopefully be complete and explain one's own disinformation.)
<http://www.vandale.nl/gratis-woordenboek/betekenis/nederlands/gestoord#.VzBSbb7KOUk> Google Translate is not subtle enough yet: https://translate.google.nl/?oe=utf-8&gws_rd=cr&um=1&ie=UTF-8&hl=en&client=tw-ob#nl/en/gestoord
- Examples of such abuse by mathematicians are **Spandaw** (21) and **Bergstra** (49).

(48) VOR division: higher education

(A) I started teaching at college level in 1997-2001. I prefer **matricola** (first year students) since education there concerns fundamentals and the impact is larger. Hence my first books VTFD and ALOE, that re-engineer their subjects, are also written as textbooks for matricola, see (10).

Henceforth, it is a relevant question why VTFD (2001) and ALOE (2007) and COTP (2011) are **not being used** in higher education. Many students in higher education who do not study mathematics would be well-served by ALOE on logic and methodology & philosophy of science, in VTFD on voting theory for democracy, and COTP on highschool math in re-engineered form. The books are available in the environment of *Mathematica*, which is an interactive environment. Using *Mathematica* comes with growing competence for doing **computer algebra** in general, which has many more uses.

To understand the blockage, we must look at the **research mathematicians** (RM) at the academia, who also provide **in-house service in education** to other fields at the academia. Are such in-house servicers motivated by RM traditions or are they focused on what is best for the clients? Supposedly RM are the judges of what counts as "mathematics", but even for judges there are courts of appeal.

- This letter mainly discusses secondary education (SE). I am not qualified for primary education (PE), and those remarks are even more tentative. These lower levels of mathematics in SE and PE **make it easy** for other fields that use mathematics to check the mathematics content of EWS, COTP and CWNN (but not the didactics, see SSI).
- The math becomes a bit more complex for matricola, higher education year 1 (HE1). Can we expect from *education researchers* with MSc degrees or perhaps even Ph.D.'s in physics or econometrics or psychometrics, or other fields that use mathematics, to be able to understand the **mathematics of matricola** as used in ALOE and VTFD and COTP? My expectation is positive, but RM might object and strike fear in the hearts of those who decided not to aspire a degree in mathematics itself.

- There now is also the new book "Foundations of Mathematics. A Neoclassical Approach to Infinity" (FMNAI) (2015). <http://thomascool.eu/Papers/FMNAI/Index.html> FMNAI **includes** 13 pages of **math** (exception !) on axiomatic set theory, that I have checked and double checked, and that must be sound. RM would have to check too before they could state a view (accept, reject with such and such reason, don't know yet). There is the option to use a **theorem-proving program** like Automath or Coq. Logician **Henk Barendregt** is involved in the use of such programs, and might be requested to do so. I asked and he did not react, but perhaps others can ask with more success. <http://thomascool.eu/Papers/ALOE/2015-06-18-Two-results-on-ZFC.pdf>

(B) Concerning ALOE, VTFD and FMNAI, my experience is that **RM breach research integrity**.

- See my explanation *What a mathematician might wish to know about my work*. <http://thomascool.eu/Papers/Math/2013-03-26-WAMMWTKAMW.pdf>
- My explanation is that also RM suffer from misdirected abstraction. ALOE, VTFD and FMNAI take a position in common sense, and re-engineer conventional math to fit common sense, and arrive at a debunking of conventional math theorems w.r.t. logic, set theory, infinity and voting theory. RM missed these results since they missed on common sense.
- W.r.t. ALOE (and overall openness of mind), **Richard Gill** is the exception. His review of ALOE is fine. He knows enough about logic and his view suffices for ALOE and its level of **matricola**. <http://www.nieuwarchief.nl/serie5/pdf/naw5-2008-09-3-217.pdf>
The downside is that all areas have specialisations, and there are now specialised logicians that might take issue of ALOE anyhow. Best is that such logicians would specify critique instead of resort to neglect.
- RM might hold that I might submit my results to journals of mathematics. But I found that re-engineering better be done in the form of a book, to build up the case from the bottom up, well suited for matricola. I have no aspiration for a degree in mathematics, only wish to apply mathematics to the specified realms, relevant for education, logic, methodology and philosophy of science, and social choice and voting. The proper response for RM is to review these books, and do this decently, without misrepresentation and slander. The books should also be reviewed by researchers in the fields that use mathematics, so that they can be amazed about how RM have been misdirected (and closed to criticism).
- Unfortunately, we meet again with the mathematical culture of "crackpot interception mode". <http://thomascool.eu/Papers/ALOE/2015-05-21-A-breach-of-integrity-on-paradoxes.pdf>
- For VTFD there is <http://thomascool.eu/Thomas/Nederlands/Wetenschap/Artikelen/2013-02-14-PasOpMetWiskundeOverVerkiezingen.html>
- A recent breach by **H.C.M. de Swart** and **F.A. Muller** is extremely sick, and quite hinders my research on Gerrit Mannoury and his students Pierre van Hiele and A.D. de Groot. <https://boycottholland.wordpress.com/2016/03/21/f-a-muller-everyone-is-welcome>
- Holland is small and there are some linkages here. <http://thomascool.eu/Papers/Math/2016-03-15-Some-experiences-with-HdS-RB-FvdDS-JvdC.html>
- For FMNAI, **Henk Barendregt** is also on the committee of recommendation of SGR, the sectarian group for "traditional mathematics education" (TME). **Klaas Pieter Hart** is in breach of integrity on this topic. <http://thomascool.eu/Papers/ALOE/2015-05-21-A-breach-of-integrity-on-paradoxes.pdf>.

It cumulates. When RM maltreat my work, they seem oblivious to the consequences of what this might have for the **perceptions of others** about my work in general. There is a lack of responsibility w.r.t. the wider consequences of inaccurate statements.

A mathematician might say that it is actually very responsible to explain that something isn't mathematics when it isn't. However, beware of the abuse of language. I don't aspire a degree in mathematics. **My books aren't books in mathematics**. It is obvious that one can say "they are not mathematics". They however are imprecise when doing so, see (47).

(C) This information would be relevant for the **VOR division on higher education**.

http://vorsite.nl/nl/divisies-en-themagroepen/hoger_onderwijs.html

"De divisie Hoger Onderwijs van de Vereniging voor Onderwijs Research richt zich op het bevorderen van onderzoek en theorievorming met betrekking tot het hoger onderwijs. Hierbij krijgt de toepassing en het gebruik van onderzoeksresultaten in instellingen voor hoger onderwijs ruim aandacht. Als beroepsvereniging richt de divisie zich ook op het bevorderen van de kwaliteit van de beroepsuitoefening van onderwijskundigen werkzaam op het terrein van hoger onderwijs. Momenteel kent de divisie circa 120 leden. De leden van deze divisie zijn als onderzoeker, docent, onderwijsontwikkelaar of beleidsmedewerker betrokken bij het hoger onderwijs."

(49) Double role by Jan Bergstra at UvA and KNAW mathematics section

In the line of (48), **Jan Bergstra** (UvA, secretary of the math section at KNAW) abuses both language and his position of authority.

There is special position for Bergstra. In 2012 I got in contact with him via mutual friends. My original contact with Bergstra was on the algebraic approach to the derivative, which might have linked up to his approach on resolving "division by zero".³ It only later dawned on me that he was also secretary of the math section at KNAW, when they organised a conference on arithmetic. <http://thomascool.eu/Papers/Math/2014-07-08-Colignatus-aan-KNAW-LOWI.html>

The email exchange is here: <http://thomascool.eu/Papers/Math/JB/Index.html>. These emails were not written for publication but are still intended as science. Making them available for others fits Thomas S. Kuhn's view on science in action. They should be illuminating for the conceptual gap between RM and MER. Also, Bergstra has an official position at KNAW, and one can see (in the email exchange on KNAW-LOWI) not only the *arguments* but also the *context* when he **rejects or neglects in 2014** two requests of mine for involvement of KNAW or the math section at KNAW. These requests were very reasonable and it is incorrect that they were not adopted.

- (a) July 5 2014 (p18): a commission to resolve blockages ("commissie van goede diensten").
- (b) July 6 2014 (p34): a repeat at KNAW of my presentation at NVvW Studiedag of the algebraic approach to the derivative. <https://boycottholland.wordpress.com/video>

There are now two papers for which I thank Bergstra for discussion though he doesn't "agree" with the papers (see the email exchanges).

- (a) <http://thomascool.eu/Papers/Math/2014-09-08-Sky-Field-Meadow.pdf>
- (b) <http://arxiv.org/abs/1408.1930>

³ It later appeared that he used the phrase "division by zero" for *error handling* and not for finding a *solution*. Bergstra's approach doesn't assume simplification (or computer algebra), but might be relevant e.g. for statistics on databases or when simplification causes error. My definition of the dynamic quotient avoids division by zero, but is a solution in the sense that it explains that what might seem as a division by zero actually isn't (zero is plugged in later). PM. (Continued footnote.) My effort at evaluating the email exchange with Bergstra (point 6 in <http://thomascool.eu/Papers/Math/JB/2016-05-06-Poging-tot-evaluatie-TC-JB.pdf>) has a question with respect to the value 0^H and the expression 0^H , both using $H = -1$ (and thus one might say that the expression would be $0^{(-1)}$), otherwise one needs a theory of meta-variables). Bergstra claims that there is a mathematical structure called "meadow" that has a value 0^H , while my impression is that this is still only an expression 0^H that can be used for error handling. Otherwise, the meadow could be used to develop derivative and integral, and I don't think that there is scope for that. Let me invite mathematicians to look into this, and let them try to explain it to those who apply mathematics who have found little use for group theory yet (unlike in physics).

For the email collection of 2014 w.r.t. KNAW conference on arithmetic and on KNAW / LOWI, the following holds: This involves more people. Obviously one is grateful for the effort shown by more people, but it is a breach of integrity when criticism isn't responded to. To *have an appearance of talk but turn a deaf ear*, doesn't work in science. The KNAW 2009 report by **Jan Karel Lenstra** showed that "realistic mathematics education" (RME) hadn't been based upon proper research. A scientist concludes: it is an ideology, comparable to astrology or homeopathy. For that reason I think that it is necessary to debunk the claimed authority of the "Freudenthal Institute", and call it by a proper name, like "*Freudenthal Head in the Clouds Realistic Mathematics Institute*" (FHCRMI). Bergstra objects to this and calls it disrespectful. He allows that **Spandaw** misrepresents and slanders my work and person, but he objects to protesting against and debunking of FHCRMI. Let me warn that Bergstra is no empirical scientist, and that he hasn't studied mathematics education and its research. His argument about "respect" is confused. Of course one treats people with respect, but *mentioning and clarifying that ideology is no science* cannot be classified as disrespect.

For *both me and Bergstra* it must hold: *No good deed goes unpunished*. A summary statement is, and let me label points and sentences.

1. (a) Bergstra isn't aware or doesn't seem to care when a halftruth "this isn't mathematics" causes people to neglect my work, or perhaps he even aspires that objective (because "it isn't mathematics"). (b) Bergstra will also say that he only gives his own modest opinion, and he only happens to be professor and secretary of the math section at KNAW. (c) Such abuse of language and authority is a breach in integrity of science.
2. (d) Bergstra in his position should acknowledge that my books **apply mathematics**, he should acknowledge that there is **criticism**, welcome **discussion** on this, insist on a discussion on **content**, resist abuse and ad hominem by Spandaw and others, and, if he takes a position himself, then give a **public statement** in sufficient detail so that possible critique is clear, instead of burking as he does. (e) That is, Bergstra has gone at length in an email discussion on above paper on "meadow" and "sky", which one may appreciate, but I am not aware of a public statement that I can refer to. (f) Potentially, Bergstra does not want to draw attention to the books ("because they aren't mathematics").
3. (g) Bergstra also employs the phrase "I do not understand what you mean (or your formula)", which is of course a strong indication that what is said isn't mathematics, as this would be clear. (h) Apart from common instances in communication when this is fair use, Bergstra however also applies that phrase when it is clear that there is obstruction on his part. (i) Common communication has moments such that one might say "if you formulate it such, then I agree" (and then don't give other content). (j) He takes the attitude as if it would be my problem to inform or convince him, or as if he can indicate that he as a mathematician takes his responsibility to clarify that something isn't mathematics. (k) Potentially this is only the attitude of a professor w.r.t. a Ph.D. student who must be able to overcome critique by other mathematicians. (l) However, my work isn't in this position.
4. (m) W.r.t. the algebraic approach to the derivative, my question was whether he could help with acceptance amongst RM. (n) The current development is proper for education in highschool, but it remains useful to see what RM think. (o) They cannot say that "this isn't mathematics" since the algebraic approach gives the same results for highschool functions as Weierstrasz "that is mathematics". (p) (This is what COTP proves.) (q) If Bergstra objects, let he give a **public statement** with adequate detail. (r) The approach is available since 2007 !
5. (s) W.r.t. mathematics education, I informed Bergstra and his KNAW section about the mis-state, and it is a breach of scientific integrity that they didn't do anything about it. (t) Their official mission is of course to support RM and research in mathematics, but they should be aware that they may be in a better position than me to inform the proper authorities (like they also organised the conference on arithmetic education).

(50) TIER, tierweb.nl

The website <http://www.tierweb.nl/tier/about-tier> gives:

"The aim of the **Top Institute for Evidence Based Education Research** is to conduct excellent scientific research and to put the results of this research at the services of (and make usable for) educational practice and educational policy. The Top Institute wants to develop knowledge of 'evidence based education' that can be made use of by: 1) the Ministry of Education, Culture and Science in policy preparation and evaluation; 2) the educational practice - such as educational institutions - in the allocation of means and in decision making when choosing between educational theories; 3) parents and students when choosing a school or training."

The website <http://www.tierweb.nl/tier/people-overview> gives:

QUOTE

TIER employs many researchers, their names can be found below.

The Scientific Management of Tier is as follows:

Scientific coordination:

prof.dr. Henriëtte Maassen van den Brink

Programme managers UM:

prof.dr. Wim Groot & prof. dr. Henriëtte Maassen van den Brink

Programme managers UvA:

prof.dr. Hessel Oosterbeek & prof.dr. Henriëtte Maassen van den Brink

Programme manager UvA/CPB:

dr. Dinand Webbink

Programme managers RUG:

prof.dr. Roel Bosker & prof.dr. Greetje van der Werf

UNQUOTE

Bosker had a presentation at the KNAW conference on arithmetic, June 30 2014.

<http://thomascool.eu/Papers/Math/2014-07-08-Colignatus-aan-KNAW-LOWI.html>

In 2003, as an economist dealing with the economics crisis and the role of the euro, I had sent an email to some fellow-economists who had published a book *De prijs van de euro* (1998), warning about the introduction of the euro. I informed them about the publication of my book with Hans Hulst (2003), *De ontketende kiezer*. Rozenberg Publishers. In 2003 Reuten gave a short notice of reception. At that time, I did not include H. Maassen van den Brink, one of the authors.

- <http://wpnetwork.letshare.com/geertreuten/wp-content/uploads/sites/5/2014/06/1998-Reuten-Vendrik-Went-Prijs-van-de-euro-Inleiding.pdf>
- <http://thomascool.eu/SvHG/DOK/DOK-Aankondiging.html>

In 2013, I sent another email to these authors, now including Maassen van den Brink. I informed them a.o. about my paper *Money as gold versus money as water*, that got published later at RWER:

- <https://mpira.ub.uni-muenchen.de/45759> (April)
- <https://rwer.wordpress.com/2013/07/02/issue-no-64-of-real-world-economics-review> (July)

QUOTE [meta data only]

Date: Sun, 05 May 2013

To: reuten [at] uva.nl, c.j.m.kool [at] uu.nl, bsnels [at] gmail.com, soete [at] merit.unu.edu, j.muysken [at] maastrichtuniversity.nl, A.H.Kleinknecht [at] tudelft.nl, j.reijnders [at] econ.uu.nl, klamer [at] eshcc.eur.nl, marcowilke [at] drechtwerk.nl, j.m.roebroek [at] tilburguniversity.edu, **h.maassenvandenbrink** [at] uva.nl, ton.notermans [at] tseba.ttu.ee
From: Thomas Cool / Thomas Colignatus
Subject: Economische crisis en uw boek "De prijs van de euro"
UNQUOTE

Over the years I have sent various of these authors various emails. These may have been read or not. These critical authors may criticise the euro, but they may still have a hard time with criticism on their own work. There is a problem in the economics profession (otherwise there would likely not be an economic crisis, see (4) for my proposal for an Economic Supreme Court for each separate nation).

Still, in 2015, I got to understand more about the failure of the psychometricians w.r.t. elementary school arithmetic (for which I am not qualified) (CITO, Van Putten, Hickendorff, see (7)). Looking for corroboration I sent an email to TIER. It might be that Maassen van den Brink no longer was busy on the euro but this issue was relevant for TIER. I regret that the email did get no reply. In this email I made the mistake of stating that Bosker was a mathematician but ten minutes later I sent a correction that he was a psychologist.

QUOTE [meta data only]
Date: Mon, 31 Aug 2015
To: **h.maassenvandenbrink**
From: Thomas Cool / Thomas Colignatus
Subject: TIER: Kwaliteitscontrole t.a.v. onderwijs in wiskunde / Verzoek tot corroboratie
Cc: wn.groot, m.p.c.van.der.werf, e.g.harskamp
UNQUOTE

- A key possibility is that TIER leaves mathematics education to FHCRM ?
- If TIER had responded adequately and timely in 2015 then CITO might still have adapted some key tests in Winter / Spring 2016, so that all pupils could get the proper teaching method starting in September 2016.
- Later, CITO was unhelpful too, see <http://thomascool.eu/Papers/AardigeGetallen/2015-10-18-Tweede-brief-aan-CITO.html>
- Without help, it now took me a while to develop the underlying documentation myself, before I had adequate corroboration to present this short summary: <http://www.wiskundebrief.nl/721.htm#5>
- A summary is given in <http://thomascool.eu/Papers/AardigeGetallen/2016-04-10-kern-misstanden.pdf>
- What are the prospects for 2017 ?
- Caveat: I remain unqualified for primary education.

(51) Education Council ("Onderwijsraad")

(A) In 2008, the following email received a reply that the document on **Simon Stevin Institute** would be read, and that I would be contacted if there were questions. Apparently there was no question *why I would write the memo*. (A.k.a. science reduced to opinion.)

QUOTE
Date: Tue, 11 Nov 2008
To: secretariaat [at] onderwijsraad.nl
From: Thomas Cool / Thomas Colignatus
Subject: Simon Stevin Instituut
[Attachment: <http://thomascool.eu/Thomas/Nederlands/Wetenschap/Artikelen/2008-11-11-Simon-Stevin-Instituut.pdf>]

Aan de Onderwijsraad

Geachte Raad,

Bijgaand treft u een opstel aan dat ik gaarne voorleg ter bespreking in uw Raad. Wellicht wilt u de gedachte aan een Simon Stevin Instituut ondersteunen, met vervolgens een verzoek aan de minister.

Hoogachtend,

Thomas Cool / Thomas Colignatus
UNQUOTE

(B) In 2012 I alerted Onderwijsraad about EWS and COTP, and saw that **F. van der Duyn Schouten** (FvdDS) was member of the council. FvdDS is a mathematician specialised in operations research (OR) (not to be confused with VOR), which is a subject that is considered part of econometrics as well (though basically empirical). Other OR-mathematicians are **Alexander Rinnooy Kan**, **Jan Karel Lenstra** and **Henk Tijms** (chair of SGR). I had met FvdDS when he was rector magnificus at University of Tilburg (UvT) and when a "review" of *De ontketende kiezer* was misrepresented and slandered by a sociologist working at UvT. <http://thomascool.eu/SvHG/DOK/Globalalternatives-2005-02-22.html>

In 2012, it was reasonable to sent FvdDS the following email. In this reproduction, I update the weblinks: (a) my website has moved from dataweb.nl to thomascool.eu, (b) similar for econpapers, (c) similar for EMS.

The email contains a submission to the mathematics teachers newsletter ("Wiskunde-brief"). They had reported on COTP in 2011 but did not publish this particular message in 2012. It may well be that the editors didn't see the **paradigm shift** either.

<http://www.wiskundebrief.nl/561.htm#9> (2011) (COTP)
<http://www.wiskundebrief.nl/589.htm#6> (2012) (petition parliamentary enquiry)
<http://www.wiskundebrief.nl/629.htm#13> (2013) (COTP)
<http://www.wiskundebrief.nl/630.htm#8> (2013) (correction)

QUOTE

Date: Thu, 19 Jan 2012

To: f.a.vdrduynschouten [at] uvt.nl

From: Thomas Cool / Thomas Colignatus

Subject: Onderwijs in wiskunde: twee gunstige recensies van mijn boeken

Geachte professor Van der Duyn Schouten,

Ik zond zojuist een bericht aan de Onderwijsraad over mijn twee boeken over het onderwijs in wiskunde. Ik zag dat u lid van die raad bent. Hopelijk bereikt het bericht u via/via. In ieder geval hebben wij elkander eerder ontmoet i.v.m. mijn klacht t.a.v. de laster door een medewerker van de UvT over mijn vermeende "verzaken" van de econometrie. Mogelijk verbaast het u dat ik nu over wiskunde schrijf. Het aardige was dat ik iets nieuws kon vinden aan de afgeleide / differentiaal van Newton en Leibniz, maar het mooiste was dat een recensent (Richard Gill, KNAW en Leiden) daarvoor open stond. Zie onder. Het lijkt me nuttig om u dan ook attent te maken op deze tekst:

<http://thomascool.eu/Papers/Drgtpe/Crisis-2007plus/2012-01-17-Wetenschapsfraude.html>

Waarom doet men overigens zo vreemd, in pensioenland ?

Met een saluut aan Jan Tinbergen, en vriendelijke groet,

Thomas Cool / Thomas Colignatus
<http://econpapers.repec.org/RAS/pco170.htm>

Date: Thu, 19 Jan 2012 11:57:22 +0100
To: <redactie wiskundebrief.nl>
From: Thomas Cool / Thomas Colignatus
Subject: Mogelijke bijdrage

Geachte redactie,

Hieronder een mogelijke bijdrage.

Met vriendelijke groet,

Thomas Cool / Thomas Colignatus
=====

Twee gunstige recensies van "Conquest of the Plane" en de gevolgen daarvan

Op verzoek van Nieuw Archief voor Wiskunde heeft Richard Gill (KNAW en Leiden) mijn boeken "Elegance with Substance" (2009) en "Conquest of the Plane" (2011) gerecenseerd. Zijn concept-tekst staat alvast hier:
<http://www.math.leidenuniv.nl/~gill/reviewCOTP.html>. Eerder was er al:
<http://www.euro-math-soc.eu/review/conquest-plane>. Richard kijkt vooral naar mijn nieuwe definitie voor de afgeleide. Het gaat ook daar om een fundamentele herziening, die ook elegant en consistent onderwijs mogelijk maakt, terwijl er aan de uitkomsten niet zoveel verandert. Bij $\text{Abs}[x]$ in het punt 0 wordt de afgeleide nul in plaats van onbepaald, dat is niet zo dramatisch anders maar wel juist wanneer het niet om de helling van raaklijnen gaat maar om de verandering van oppervlakte. De Spaanse recensent bekent zich aanvankelijk ongemakkelijk te voelen met het "anders schrijven" van volkomen "bekende wiskunde" maar verklaart uiteindelijk: "enjoy". Met deze recensies is een klein stapje naar een bredere discussie gezet. De recensies bespreken nog niet de vele andere bijdragen van EWS en COTP aan didactiek en onderwijs. Bijvoorbeeld de uitleg in COTP 15.2 over de verwarring van Freudenthal met zijn "realistische" wiskunde en het gelijk van Van Hiele met zijn niveau's. In deze Verovering van het Platte Vlak wordt het lege vlak eerst met materiaal bevolkt, maar dat materiaal blijft bestaan uit wiskundige concepten, in casu "benoemde lijnen", om de leerling ermee te laten werken en daardoor de kans te geven naar een hoger niveau van begrip te springen. Van belang is vervolgens het veranderingsproces richting feitelijk onderwijs. Mijn advies is dat wiskundedocenten nu gaan lezen, en aan docenten van andere vakken, ouders en Tweede Kamer duidelijk maken dat het huidige onderwijs fundamentele gebreken vertoont door historisch gegroeide fouten, waardoor leerlingen ernstig te lijden hebben. De TK kan dan middelen vrijmaken voor empirische toetsing, ontwerp van het nieuwe programma, herscholing e.d.. Wanneer Nederland nu gaat lezen dan kan de TK na Pasen al met brieven overladen worden. Zo moeilijk is die wiskunde in EWS en COTP nu ook weer niet. Bovendien: "enjoy". Het gaat erom dat men leest met een open geest en dat men de bereidheid heeft te erkennen dat het fundamenteel verkeerd zit zodat alleen fundamentele herijking zin heeft. Ja, ook wat nu allemaal aan het rekenonderwijs gesleuteld wordt vertoont grote mankementen en het moet mogelijk zijn de vectoren al in de basisschool te behandelen. Wie denkt dat er geen geld voor verandering beschikbaar is beseft dat het in de wereld der economen nog fundamenteel mis zit, zodat er best gelden zijn vrij te maken, terwijl ook investeringen nodig zijn, zie eventueel <http://thomascool.eu/Papers/Drgtpe/Crisis-2007plus/Index.html>

Thomas Cool / Thomas Colignatus, econometrist en leraar wiskunde,
<http://thomascool.eu>
UNQUOTE

In 2016, FvdDS is chairman of the committee that must implement "**Deltaplan Wiskunde**".

- <http://thomascool.eu/Papers/Math/2016-03-15-Some-experiences-with-HdS-RB-FvdDS-JvdC.html>
- <http://thomascool.eu/Papers/AardigeGetallen/2016-03-22-Minister-krijgt-een-misleidend-Deltaplan-Wiskunde.pdf>

(C) In 2015, it so happens that Henriëtte Maassen van den Brink and Greetje van der Werf are members of "Onderwijsraad", who I already addressed in TIER as well, see (50). Presumably, a message sent to them doesn't count as a message sent to the Education Council, but there is the possibility that it is forwarded. (I see now: in the name of Maassen van den Brink I erroneously wrote "Van", with a capital letter.)

QUOTE

Date: Sat, 19 Sep 2015

To: h.maassenvandenbrink, m.p.c.van.der.werf

From: Thomas Cool / Thomas Colignatus

Subject: Positie Onderwijsraad vs Comite van Aanbeveling SGR - Re: Aanvulling: integriteitskwestie Jan van de Craats en Ben Wilbrink: TIER: Kwaliteitscontrole t.a.v. onderwijs in wiskunde / Verzoek tot corroboratie

Cc: wn.groot, e.g.harskamp, s.doolaard [potentially missed because of . vs ,]

Geachte professores Maassen Van den Brink en Van der Werf,

Ik zag tot mijn verrassing dat u lid bent van de Onderwijsraad, en, dat u mogelijk in een voorgaande periode een aanbeveling heeft gedaan voor de Stichting Goed Rekenonderwijs (SGR), die nu echter steen des aanstoets is. Op zijn minst is het aan te bevelen die plaats op het "Comite van Aanbeveling" bij SGR van een datum te voorzien en dat het niet voor eeuwig is.

Mijn weblog geeft een voorbeeld van slechte didactiek als gevolg van Van de Craats zijn inbreuk op de integriteit van wetenschap:

<https://boycottholland.wordpress.com/2015/09/19/jan-van-de-craats-tortures-kids-with-fractions>

Ik doe kopie aan dr. Doolaard bij GION zodat zij kan afwegen of Roel Bosker nogmaals mag horen dat ook hij in overtreding is, nu met meer informatie over de rol van Jan van de Craats.

Met vriendelijke groet,

Thomas Cool / Thomas Colignatus
Econometrist en leraar wiskunde

At 2015-09-16 14:30, Thomas Cool / Thomas Colignatus wrote:
Geachte prof. Maassen Van den Brink,

Ik heb moeten constateren dat Jan van de Craats en Ben Wilbrink een inbreuk plegen op de integriteit van wetenschap, zie hier:

<http://thomascool.eu/Papers/Math/2015-09-15-Breach-by-Jan-van-de-Craats-and-Ben-Wilbrink-wrt-scientific-integrity.html>

T.a.v. de lesmethoden van "realistisch rekenen" en de nieuwe methode "Reken Zeker" wordt nu een "survival of the fittest" experiment gevoerd, dat geen rekening houdt met regels t.a.v. menselijke proefpersonen.

Mijn vermoeden is dat "Reken Zeker" wel beter zal zijn, maar de "evidence base" is beperkt. En als het inderdaad de betere methode is gebleken, dan moet je het experiment stopzetten, en iedereen het betere middel geven. Of je beschouwt kinderen slechts als hulpmiddel voor een groter ego.

Met vriendelijke groet,

Thomas Cool / Thomas Colignatus

At 2015-08-31 11:15, Thomas Cool / Thomas Colignatus wrote:
Geachte prof. Maassen Van den Brink,

Correctie: Ik schreef dat Roel Bosker wiskundige zou zijn, maar dat moet psycholoog zijn. De juiste kritiek is dat hij als psycholoog onvoldoende zicht heeft gehad op het abstract denken van wiskundigen die met onderwijs bezig zijn; en dat hij niet inging op mijn kritiek terzake.

Met vriendelijke groet,

Thomas Cool / Thomas Colignatus

At 2015-08-31 11:03, Thomas Cool / Thomas Colignatus wrote:
Geachte prof. Maassen Van den Brink, (...)

UNQUOTE

Concluding

The length of this letter surprises me too, but it appeared that VOR had more divisions – to indeed cover the rich aspects of education and its research – while I felt that I should try to make it abundantly clear that other avenues have been tried so that it is proper to ask for relevant action by VOR board and training directors. The above contains some suggestions.

I hope that you recognise that my approach has been prudent, comprehensive, empathic, and patient, and that I have been very clear about the **paradigm shift** w.r.t. the education in mathematics and its research, which is important for other fields. Progress is blocked when there is no action on creating a Simon Stevin Institute (ISS), as explained above.

You are stakeholders and fresh to the situation, as I have had no contact before with the VOR board or institutes of training of teachers, other than ICLON where I got my own degree. I kindly request that you use that freshness to study and retrain with a focus on said action.

This letter is also on my website.

<http://thomascool.eu/Papers/Math/2016-05-09-Letter-to-VOR-and-Trainers-of-teachers.pdf>

Sincerely yours,

Thomas Cool / Thomas Colignatus
Econometrician (Groningen 1982) and teacher of mathematics (Leiden 2008)
Scheveningen
<http://thomascool.eu>