

Editorial: Why do you 'need-to-know': context-based education

Pilot, Albert; Bulte, Astrid M.W.

Postprint / Postprint

Zeitschriftenartikel / journal article

Zur Verfügung gestellt in Kooperation mit / provided in cooperation with:

www.peerproject.eu

Empfohlene Zitierung / Suggested Citation:

Pilot, A., & Bulte, A. M. (2007). Editorial: Why do you 'need-to-know': context-based education. *International Journal of Science Education*, 28(9), 953-955. <https://doi.org/10.1080/09500690600702462>

Nutzungsbedingungen:

Dieser Text wird unter dem "PEER Licence Agreement zur Verfügung" gestellt. Nähere Auskünfte zum PEER-Projekt finden Sie hier: <http://www.peerproject.eu> Gewährt wird ein nicht exklusives, nicht übertragbares, persönliches und beschränktes Recht auf Nutzung dieses Dokuments. Dieses Dokument ist ausschließlich für den persönlichen, nicht-kommerziellen Gebrauch bestimmt. Auf sämtlichen Kopien dieses Dokuments müssen alle Urheberrechtshinweise und sonstigen Hinweise auf gesetzlichen Schutz beibehalten werden. Sie dürfen dieses Dokument nicht in irgendeiner Weise abändern, noch dürfen Sie dieses Dokument für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, aufführen, vertreiben oder anderweitig nutzen.

Mit der Verwendung dieses Dokuments erkennen Sie die Nutzungsbedingungen an.

gesis
Leibniz-Institut
für Sozialwissenschaften

Terms of use:

This document is made available under the "PEER Licence Agreement". For more information regarding the PEER-project see: <http://www.peerproject.eu> This document is solely intended for your personal, non-commercial use. All of the copies of this documents must retain all copyright information and other information regarding legal protection. You are not allowed to alter this document in any way, to copy it for public or commercial purposes, to exhibit the document in public, to perform, distribute or otherwise use the document in public.

By using this particular document, you accept the above-stated conditions of use.

Mitglied der

Leibniz-Gemeinschaft



Editorial: Why do you 'need-to-know': Context-Based Education

Journal:	<i>International Journal of Science Education</i>
Manuscript ID:	TSED-2006-0053
Manuscript Type:	Special Issue Research Paper
Keywords:	chemistry education, curriculum
Keywords (user):	context-based



1
2
3 ***Special issue of IJSE on Context Based Chemistry Education***
4

5 ***(Total of 8 papers, including the editorial)***
6
7

8
9
10 **Title Special Issue:**
11

12
13
14
15 **Challenges to Chemistry Education:**
16
17
18 **Reflecting on Context-Based Curriculum Design**
19
20
21
22
23
24
25
26
27

28
29 Albert Pilot

30
31 Astrid M.W. Bulte

32
33
34
35
36 Centre for Science and Mathematics Education, Utrecht University,
37
38 Princetonplein 5, NL 3584 CC, Utrecht, The Netherlands
39

40
41
42
43 Correspondence to:

44
45 *Albert Pilot

46
47 a.pilot@ivlos.uu.nl
48

49
50 Phone: xx-31-30-2532150

51
52 Fax: xx-31-30-2537494
53
54
55
56
57
58
59
60

Editorial

Why do you 'need to know': Context-Based Education

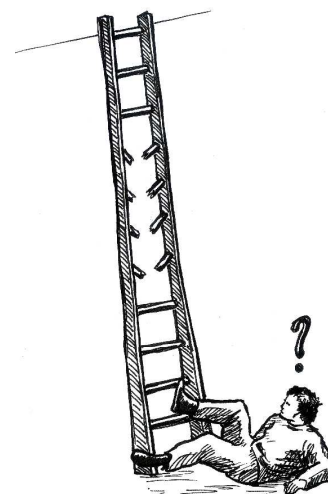
Albert Pilot*

Astrid M.W. Bulte

Centre for Science and Mathematics Education, Utrecht University,

Princetonplein 5, NL 3584 CC, Utrecht, The Netherlands

'Most of us who are scientists have enjoyed climbing this ladder as part of our education. We revel in the lofty view from the top. Unfortunately, many students do not see the connection between the successive rungs. They are not told and do not discover why or where they are climbing. Before long they develop vertigo. Often they jump or fall off the ladder before they reach the top. All they take from the experience is distaste for science'. (Schwartz, this issue)



Schwartz' metaphor provides us with a clear picture of curricular problems many of us wish to address when developing context-based science education. We acknowledge that students have to climb a ladder with too many rungs (curriculum-overload), which they do not organise into a coherent mental map of transferable knowledge. Furthermore, many of us understand that students do not see why they are climbing (relevance) or where their learning

1
2
3 leads to other than 'the next step in their education' as a default emphasis for science
4
5 education.
6
7
8
9

10 In the first article of this Special Issue about Context-based Chemistry Education, Gilbert
11 summarises these interrelated curriculum problems, and poses a series of challenges for
12 context-based education. Gilbert derives criteria for the systematic development of context-
13 based approaches that should both bring the learning of science closer to the lives and
14 interests of students and show how the use of contexts would improve their interest in science
15 and therefore enhance their understanding. This Special Issue with a description of five
16 different context-based approaches includes a reflection on Context-based Chemistry
17 Education. It evaluates the extent to which such approaches can address these curriculum
18 challenges, applying Gilbert's criteria and models for the use of 'context'.
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33

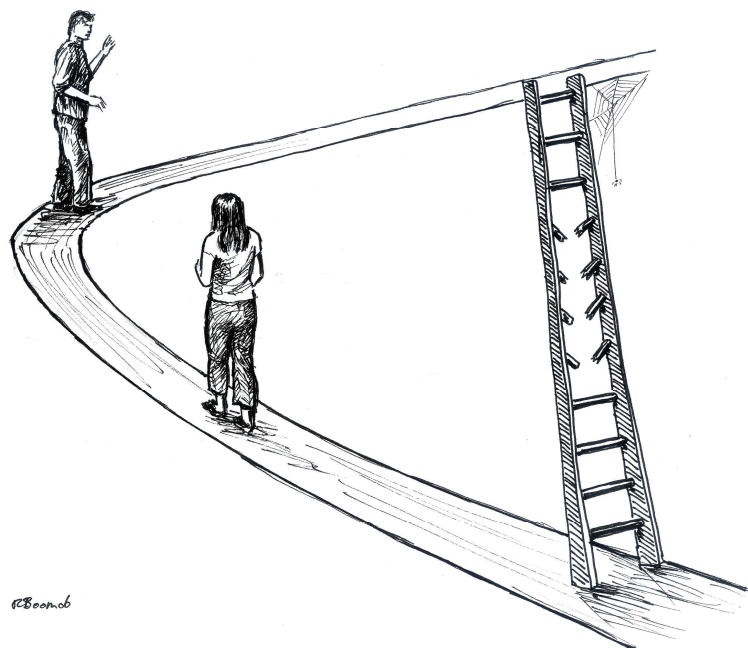
34 The need for this study of the development and understanding of the use of 'contexts', its
35 successes and failures, has risen from the growing interest in context-based education. This
36 interest is evident, both within the community of researchers and designers of chemistry
37 curricula and within organisations preparing and deciding on governmental policy concerning
38 chemistry education. For these developments, we can point to the five approaches described
39 in this Special Issue: Chemistry in Context in the USA (Schwartz), Salters Advanced
40 Chemistry in the UK (Bennett & Lubben), Industrial Chemistry in Israel (Hofstein & Kesner),
41 Chemie im Kontext in Germany (Parchmann, Gräsel, Baer, Demuth, Ralle & the ChiK team),
42 and a context-concept approach in the Netherlands (Bulte, Westbroek, De Jong & Pilot). This
43 team of authors worked on this Special Issue of the International Journal of Science
44 Education, emanating from a symposium at the ESERA conference in Barcelona 2005.
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

1
2
3 We found that the choice of contexts as starting point for the design of curricula and units
4 within those curricula offers fruitful opportunities to avoid overload and to provide a
5 representative curriculum. Selecting content on a need-to-know basis was used successfully to
6 enable the development of coherent mental maps of knowledge in the domain of chemistry
7 and to increase the relevance of the subject. However, very few explicit reports about the
8 development of coherent mental maps of chemical knowledge are available. Almost none of
9 the approaches adequately address the challenge of facilitating the 'transfer of learning'. The
10 analysis also shows that explicit or implicit choices were made to broaden the aims of
11 chemistry education using other than conventional emphases. We found a number of factors
12 that were fostering or hindering the development and implementation process: the nature of
13 the design and developmental process; the key characteristics of the framework of the course
14 design; and some conditional circumstances during the development. These findings are
15 related to the challenges Gilbert describes in the first paper. The key characteristics of the
16 framework are also interpreted in terms of the 'models of context'. Furthermore, the necessary
17 steps for the professional development of teachers, and the acceptance of context-based
18 learning and innovative assessment systems by stakeholders are related to the criteria for
19 successful context-based education.
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45

46 The focus on Chemistry Education allowed for some comparison between the complex
47 situation of different nations, educational systems and developments over a period of four
48 decades. Despite this limitation, we have reasons to believe that our findings can be insightful
49 for the broader field of Science Education. A systematic description of the developments is a
50 first step towards the extraction of a theoretical knowledge base for context-based education.
51 It aims to formulating new hypotheses and challenges for the agenda of future systematic
52 curriculum development.
53
54
55
56
57
58
59
60

1
2
3
4
5
6 The papers are sequenced in the usual academic linear structure: first a theoretical basis about
7
8 the nature of 'context', then the description of the five context-based approaches, and a final
9
10 paper wrapping up the main findings of our study. As a reader however, you may apply a
11
12 different style of reading and learning. Perhaps you acknowledge this usual linear structure,
13
14 but you also may scan through the papers, picking up some findings here and there,
15
16 wondering why some conclusions were drawn and going back to the theoretical aspects. We
17
18 encourage you to find a pattern of interconnected links between theory and evidence about the
19
20 learning and teaching of chemistry. We hope that by means of the final paper we can provide
21
22 you with a 'need-to-know' about the successes, struggles, challenges and hard work of those
23
24 who wish to motivate and educate the large numbers of young people, willingly or
25
26 unwillingly in chemistry education. The authors feel a need for the further development of
27
28 strategies to enable students to develop a coherent mental scheme of chemistry such that they
29
30 can make connections to and between what is meaningful to them. Moreover, there is the
31
32 issue of large scale acceptance of context-based education:
33
34
35
36
37
38
39
40

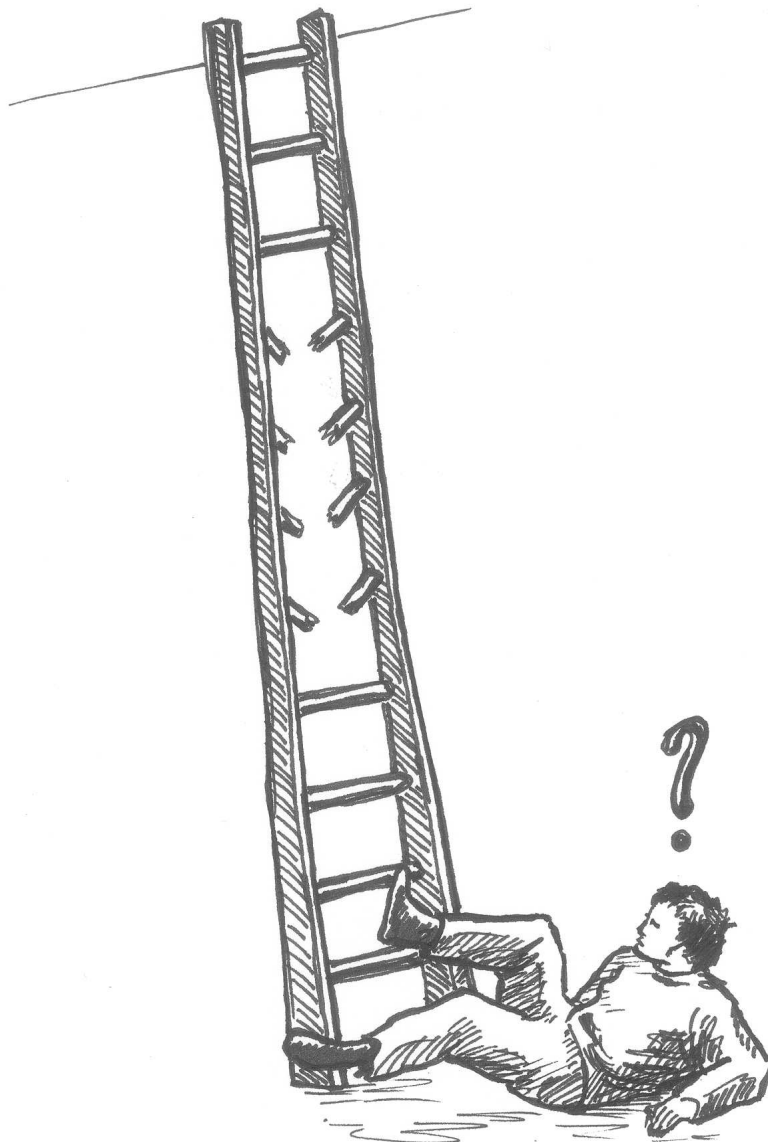
41 how does one overcome the activation-energy barriers to any educational reform,
42
43 especially faculty obsession with covering the content rather than uncovering information for
44
45 their students to discover? (Schwartz, this issue)
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60



Reference

Schwartz, A. T. (this issue). Contextualised Chemistry Education: The American Experience.
International Journal of Science Education.

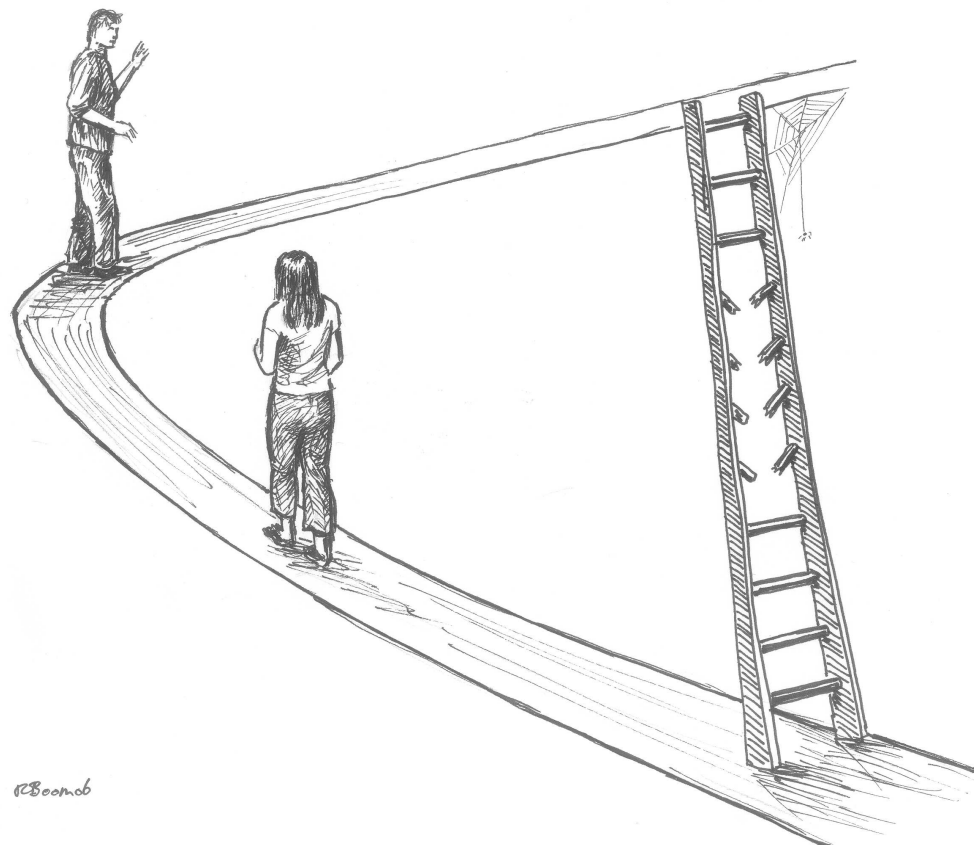
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60



RBoomob

no
500x636mm (72 x 72 DPI)

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60



no
834x734mm (72 x 72 DPI)

Only