



Using networked computers to help school students to learn about science through discussion

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The rise of networked computers

1996: 58% of schools use electronic mail, 30% use Web (DfEE)

2003: 86.5% of school computers are connected to the Internet, 86% of schools have >2Mbit/s connection

WORLD INTERNET USAGE AND POPULATION STATISTICS						
World Regions	Population (2005 Est.)	Population % of World	Internet Usage, Latest Data	Usage Growth 2000-2005	Penetration (% Population)	World Users %
Africa	900,465,411	14.0 %	13,468,600	198.3 %	1.5 %	1.5 %
Asia	3,612,363,165	56.3 %	302,257,003	164.4 %	8.4 %	34.0 %
Europe	730,991,138	11.4 %	259,653,144	151.9 %	35.5 %	29.2 %
Middle East	259,499,772	4.0 %	19,370,700	266.5 %	7.5 %	2.2 %
North America	328,387,059	5.1 %	221,437,647	104.9 %	67.4 %	24.9 %
Latin America/Caribbean	546,917,192	8.5 %	56,224,957	211.2 %	10.3 %	6.3 %
Oceania / Australia	33,443,448	0.5 %	16,269,080	113.5 %	48.6 %	1.8 %
WORLD TOTAL	6,412,067,185	100.0 %	888,681,131	146.2 %	13.9 %	100.0 %

NOTES: (1) Internet Usage and Population Statistics were updated on March 23, 2005. (2) For detailed regional data, click on each World Region. (3) Demographic (population) numbers are based on data contained in the web site world-gazetteer. (4) Internet usage information comes from data published by Nielsen/NetRatings, by International Telecommunications Union, by NICs and other reliable sources. (5) Data from this site may be cited, giving the due credit and establishing an active link back to InternetWorldStats.com. (6) For navigation help and definitions, see the [Site Surfing Guide](#).

Source: www.internetworldstats.com/stats.htm [24th Mar 2005]

The use of networked computers

Widespread use in universities and other institutions to promote learning and professional development [Fullick, 2004]

Widespread use by young people in their personal lives:

- 92% of children have accessed the Internet from school
- 75% of children access the Internet from home
(88% middle class / 61% working class : home use > school use**)
- 36% have >1 computer at home
- 24% have broadband
- 19% have access in their bedroom
- 79% report using the Internet on their own

* Livingstone, S. and Bober, M. (2004) *UK Children Go Online: surveying the experiences of young people and their parents*. London: London School of Economics and Political Science.

** Harrison, C., Comber, C., Fisher, T., Haw, K., Lewin, C., Lunzer, E., McFarlane, A., Mavers, D., Scrimshaw, P., Somekh, B., and Watling, R. (2003) *ImpaCT2: The Impact of Information and Communication Technologies on Pupil Learning and Attainment*. London: DfES.

Pew Internet survey findings*

- 73% of young people aged 12 to 17 use the Internet
(“use” not defined)
- 76% of online teens say they would miss the Internet if they could no longer go online
- 48% say their use of the Internet improves their relationship with friends
- 32% say Internet tools help them make new friends
- 64% of online teens say they think use of the Internet takes away from the time young people spend with their families
- 74% of online teens use instant messaging

* Lenhart, A., Rainie, L., and Lewis, O. (2001) *Teenage life online: the rise of the instant-message generation and the Internet's impact on friendships and family relationships*. Washington DC: Pew Internet & American Life Project.

Pew Internet survey findings*

- 74% of online teens use instant messaging
- 69% of teen instant messengers use IM at least several times a week
- 19% of online teens say they use IM most often to contact their friends when they are not with them - 8% use email, 71% still use the phone most often
- 37% have used IM to write something that they would not have said in person
- 17% of instant messengers have used IMs to ask someone out
- 13% have used instant messaging to break up with someone
- 64% have refused to respond to instant messages from someone they were angry with

* Lenhart, A., Rainie, L., and Lewis, O. (2001) *Teenage life online: the rise of the instant-message generation and the Internet's impact on friendships and family relationships*. Washington DC: Pew Internet & American Life Project.

The Internet as a space for emerging identities

- "Children's motivations for going online centre on new opportunities for communication and identity play. While the conversational content is often mundane, being readily in touch with their friends is important to them." ¹
- "... young people find some forms of on-line communication more private and more intimate than off-line communication - they use MSN/IM [instant messaging software] to discuss personal problems, ask for advice from peers, etc." ²
- New technologies and children's lives form a "powerful association" in which children and technology are "natural bedfellows." ³

¹ Livingstone, S. and Bober, M. (2003) *UK Children Go Online: listening to young people's experiences*. London: London School of Economics and Political Science.

² Media Awareness Network (2004) *Young Canadians in a Wired World - Phase II*. Ottawa: Media Awareness Network.

³ Facer, K., Furlong, J., Furlong, R., and Sutherland, R. (2003) *ScreenPlay: children and computing in the home*. London: RoutledgeFalmer.

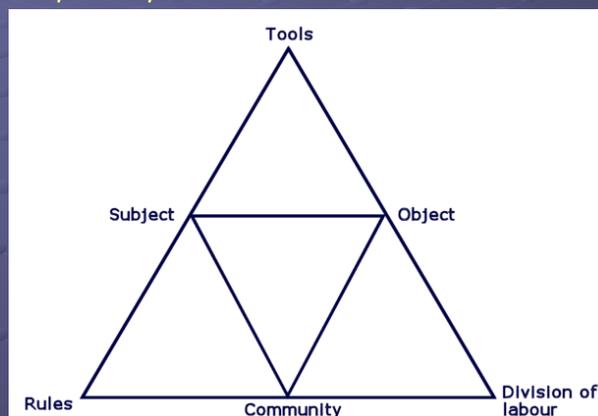
Networked computers in school science

Classification	Use
retrieving information	Internet for research Websites for revision using GCSE online resources
communicating/sharing information	production of a Website online student portfolio online real-time quiz

Nowhere ... is there any evidence to suggest that networked computers are used in secondary school science in the UK to encourage students to share their ideas with other students in a dynamic way - employing them to foster co-operative learning. [Fullick, 2004]

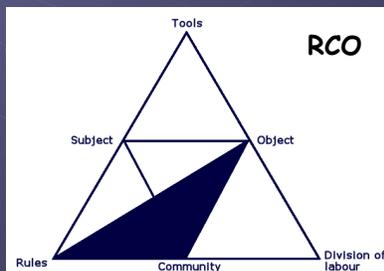
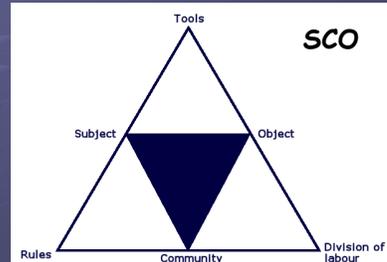
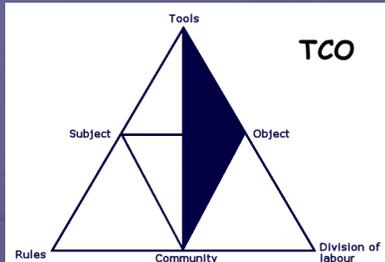
Theoretical framework

- how should we view a group of learners interacting in a classroom and online, guided by a teacher?
- activity theory:

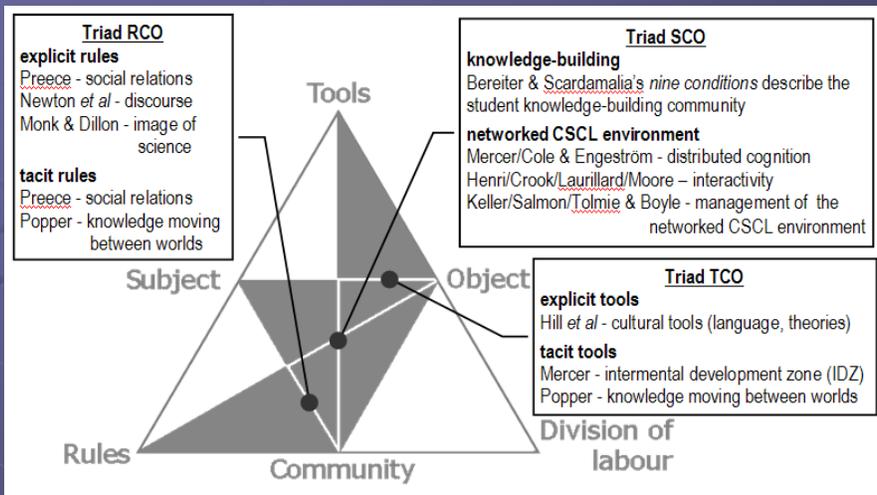


Theoretical framework

activity theory triads :



The triads – SCO, TCO, RCO



Online interactions

Research study subjected logfiles to critical incident recall

A group which exists through an exchange of written texts has the peculiar ability to recall and inspect its entire past. Nothing quite like this is available to a community based on the spoken word. [Feenberg, 1989]

The database of contributions acts as "an objectification of the group's advancing knowledge, much like the accumulating issues of a scholarly journal". [Bereiter & Scardamalia, 1993]

Outcomes – triad RCO

Personal qualities

chmy14_1287	its a bit hard to follow [name]
chmy14_1288	i no
chmy14_1290	she can't spell properly
chmy14_1293	she rushes to say evry thing

Andrea's very much up the front there, contributing the whole time. Eleanor will as well. Sarah needs a bit of poking to get an answer from, I think because they will have discussed it in their group ... because I think that sometimes Andrea does the talking for them ...

(teacher interview)

The proceedings did not, as it were, alternate between knowledge of people and knowledge of things. Rather, knowledge of people was constitutively used to make and unmake knowledge of things. There was no point at which participants could help themselves to a pure form of 'thing-knowledge' since ... schemes of plausibility are built up through prior decisions about who, and in what connections, counts as trustworthy source. (Shapin, 1994)

What seems to have been most important in the debate was the trenchant criticism, careful analysis, and confrontational style of one powerful member of the physics community, Richard Garwin.

(Collins & Pinch, 1994)

Outcomes – triad TCO

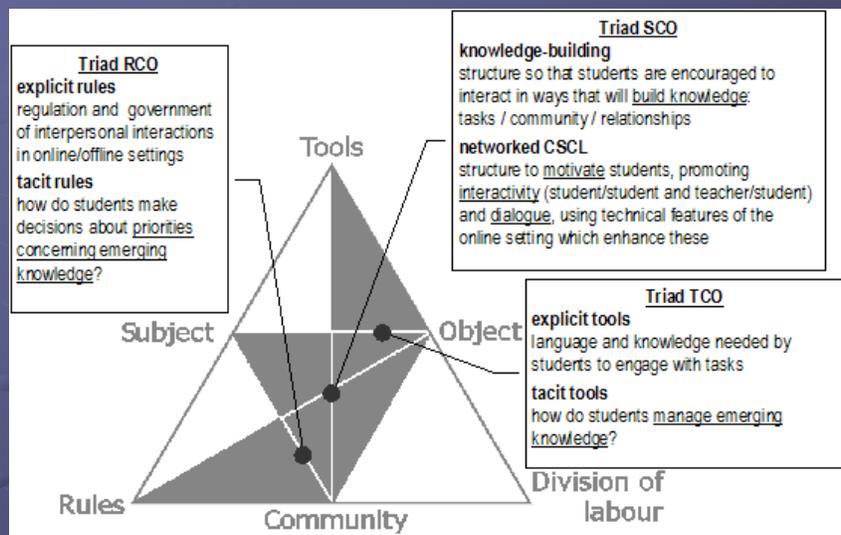
leila_jnp	egg gets smaller coz of protease that react wid proteins/
leila_jnp	i get it now . .kinda
teacher	get some good results?
andy_agp	not particularly.. noting uneggspected...
leila_jnp	yer asda smart price decreases the size of du egg wite at bout 60 degrees
andy_agp	by 1.44G!!!
leila_jnp	really wel
teacher	was that the best powder?
leila_jnp	lol
andy_agp	we think so...
leila_jnp	asda smart price
andy_agp	cheapest and best...
connor_hlp	we allready sed asda is
teacher	1.44g is a big decrease

Researcher If we tested all the washing powders using this test could you say "this is the best washing powder"?

Andy You could say that all signs point towards it but you could never be certain or sure about it because anything could have been changed.

Leila 'Cos they're always bringing out new stuff, aren't they?

Pedagogical implications





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