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(112)

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(ANCOVA)

%10.1 %63.2
.%23.5 %63.9

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(Head, 1982)

(Bergquist and

Heikkinen, 1990)

(Hodge, 1993)

(Schmidt,

1999; Schmidt, Baumgartner and Eybe, 2003)

.(Stake and Easley, 1978)

(Osborne and

.Freyberg, 1985)

(Driver and Easley, 1978; Krishnan and Howe,

" " .(2007 1994)

(Haidar and Abraham, 1991;

.de Posada, 1997)

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.2008/9/3

2008/3/23

(Kavanaugh and Moomaw, .1981)

(Banerjee, 1991)

(Bar and Travis, 1991)

(Benson, (Barker and Millar, 1999)

(BouJaoude Wittrock and Baur, 1993)

(Griffiths and and Barakat, 2000) (Osborne and

(Ross and Munby, Preston, 1992) .Wittrock, 1983)

(Peterson, Treagust and Garnett, 1991)

.1986)

."Conceptual Change"

.(Hewson, 1981) "Schemata"

(Cros, Chastrette (Posner, Strike, Hewson and Gertzog, 1982)

400 and Fayol, 1988)

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%93

%56 %61

()

%43 (Hewson and

.Hewson, 1984; Hewson and Thorley, 1989; Niaz, 1995)

pH %17

(Ross and Munby, 1991)

(Cros et al., 1988)

"

" 7 (pH)

" H^+

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(Ross and Munby, 1991)

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(Demerouti, Kousathana and Tsaparlis, 2004 a,

3

b)

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119

.(Open-type questions)

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pH

(Driver and

Easley, 1994)

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(Pinarbasi, 2007)

(Nakhleh and Krajcik, 1994)

pH

(91)

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pH

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(Posner,

Strike, Hewson and Gertzog, 1982; Hewson, 1981)

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- (Ting and Chong, 2003)
- (Hynd, Mcwhorter, Phares and Suttles, 1994; Hewson and Hewson, 1983; Stofflett, 1994)
- (Limon, 2003; Hewson, Beeth and Thorley, 1998)
- (Bergquist and Heikinen, 1990)
- (Uzuntiryaki, 2003; Brophy, 1986)
- (Duit, 2002)
- (Pintrich, Marx and Boyle, 1993)
- (Hand and Treagust, 1991)
- (Baser, 2006; Lee, Kown, Park, Kim, Kown and Park, 2003; Kim, Choi and Kown, 2002; Kown, 1997; Druyan, 1997; Niaz, 1995; Thorley and Treagust, 1989; Hashweh, 1986)
- (Baser, 2006)
- (82)
- (42 =)
- (40 =)
- (1993)
- (Kown, (Lee et al., 2003)
- (Kown and Lee, 1997)
- (%50)

.(/) (0.01 >)

(Cakir, Uzuntiryaki

and Geban, 2002)

: (110)

)

.(

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-1

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-2

(

(Akar, 2005)

5E's

:

-1

(56)

-2

5E's

)

.(

-3

.5E's

:

(4E's)

-1

(2007)

Traditional Method ()
() ()
/ -2

2007/2006

Misconceptions

(112)

Conceptual Change

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Conceptual Conflict

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:

(Posner, Strike, Hewson
and Gertzog, 1982)

.(45)

Achievement

(1) : (2006) 2007/2006
 (3) . (2) . (2007)
 (1)

(1) :

(2) .

NaOH

HCl

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+

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4

3 - 2

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				HCl
				NaOH

(1)

(45)

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-1

(2006)

-2

-3

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(17)

-4

-5

3

5 /

2

/ 3

(5 - 4)

-6

40

(0.92)

(KR20) 20

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(1)

(1)

2007/2006

()

(ANCOVA)

(2)

.SPSS

()

(13.41 =)

.(11.45 =)

$O_1 \times O_2$
 $O_1 \quad O_2$

.(0.24= η^2)

(3)

(ANCOVA)

()

%39.3

%63.2

%92.9

%.%63.9

%89.3

%42.9

"

"

(3)

pH " " .
" " .
" " ...
%10.1 %21.4 %0.0
" " %10.7
%23.5 %57.1
"
.
(Tsai, 1999;
.Guzzetti, Snyder and Gamas,1993) :
" " pH "

(1)

1.74	13.41	1.9	8.18	56	
1.8	11.45	1.86	8.14	56	

.17 =

(2)

()	()				
0.000	*39.963	92.123	1	92.123	
0.000	*46.036	106.123	1	106.123	
		2.305	109	251.269	
			111	451.429	

"
.
" ...
%58.9
%55.4
.(Songer and Mintzes, 1994)

(3)

21.4	12	58.9	33	16.1	9	66.1	37	
21.4	12	51.8	29	8.9	5	46.4	26	
25.0	14	42.9	24	0.0	0	39.3	22	pH
28.6	16	51.8	29	0.0	0	55.4	31	pH
17.9	10	78.6	44	14.3	8	75.0	42	pH
23.2	13	50.0	28	16.1	9	44.6	25	
14.3	8	55.4	31	0.0	0	58.9	33	...
30.4	17	89.3	50	19.6	11	92.9	52	
25.0	14	64.3	36	12.5	7	67.9	38	pH
16.1	9	67.9	38	12.5	7	64.3	36	
57.1	32	67.9	38	21.4	12	64.3	36	H ⁺ OH ⁻
19.6	11	69.6	39	14.3	8	67.9	38	
17.9	10	60.7	34	0.0	0	60.7	34	
21.4	12	50.0	28	10.7	6	42.9	24	
21.4	12	66.1	37	16.1	9	73.2	41	pH
10.7	6	78.6	44	8.9	5	76.8	43	
28.6	16	82.1	46	0.0	0	78.6	44	
23.5		63.9		10.1		63.2		

%14.3

(Ross and Munby, 1991)

%21.4 " "

%57.1

OH^- H_3O^+ "

$/$ $7-10$ "

()

(Nakhleh (Dry lab)

and Krajcik, 1994)

%19.6 " "

%30.4

2005 ()

1993

2006

2007

2007

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The Effect of Conceptual Conflict Based Instruction on Achievement and Bringing about Conceptual Change of Acid-Base Concepts of the Ninth Grade Students

*Salem A. Alkhawaldeh and Mustafa H. Mustafa**

ABSTRACT

The purpose of this study was to investigate the effect of the conceptual conflict method on achievement and bringing about conceptual change of acid-base concepts of the ninth grade students compared with the traditional method. The sample of the study consisted of 112 students in four classes. The classes were distributed randomly to form the experimental group (two classes) and the control group (two classes). While the experimental group received conceptual conflict based instruction, the control group was taught by traditionally designed chemistry instruction. All students were administered the acids and bases concept pre-test and post-test.

A pretest-posttest control group design utilizing analysis of covariance (ANCOVA) showed a statistically significant difference between the experimental and the control groups in the favor of the experimental group after treatment.

The results indicated that while the average percentage of students in the experimental group holding misconceptions has decreased from 63.2% to 10.1%, the percentage of misconceptions of the students in the control group has decreased from 63.9% to 23.5%.

Keywords: Misconceptions, Conceptual change, Conceptual conflict, Chemical activities, Acids and bases.

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