

An Examination of the Behavioral Effects of Virtual Reality on Human Social Interaction

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Abstract—

6WDWHRIWKHDUWWHFKQRORJ\KDVWKHWUHPHQGRX VLPSPDFW RQRXUOLIHQWKLVLVLDXDWLRQHGXFDFWLRQV\VWHPK DYHEHHQLQIOXHQFHGDV ZHOODV,QWKLVSDFSHUWULHGWRFRPSDUHWZRVDFHRI OHDUQLQJWH[WDQG K\SHUWH[WZLWKHDFKRWKHUHQGVRPHFKDOOHQJHVR IXVLQJK\SHUWH[WLQ UHOLJLRXV HGXFDFWLRQ 5HJDUGLQJ WKH IDFW WKDW K\SHUWH[WLV DQ XQGHQDEOHSDUWRIOHDUQLQJLQWKLVLVZRUOGDQGLW KDVKLJKO\EHQHILFLDO IRUWKHHGXFDFWLRQSURFHVVIVURPFODVVWRRILFHDQG KRPH,QWKLVSDFSHU WULHG WR VROYH WKLW TXHVWLRQWKH FRQVHTXHQFHV DQG FKDOOHQJHV RI DSSO\LQJK\SHUWH[WLQUHOLJLRXVHGXFDFWLRQ\$OVRW KHFRQVHTXHQFHVRI WKLVLVXUYH\GHPRQVWUDWHWKHURHIFXUULFXOXP GHVLJQHDSODQGHU RIHGXFDFWLRQWRVROYHWKLVSUREOHP

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7\$7(RI WKH DUW WHFKQRORJ\ KDV D WUHPHQGRXVLPSPDFW RQ WKH SHRSOH VOLYHV 7RGD\ HGXFDFWLRQ KDV EHHQ LQIOXHQFHG E\ WHFKQRORJLFDQ LQQRYDWLRQ 7HFKQRORJLFDQ LQQRYDWLRQ PHDQVWRHQKQDQFHWKHIXQFWLRQDODQGFRRPPXQ LFDWLYHFRQWH[WV LQWRZKLFKLWLVSODFHG\$OWKRXJKWHFKQRORJ\ LQQRYDWLRQLVDQ XQGHQDEOHSDUWRIOHDUQLQJLQWKLVLVZRUOGDQGLW KHSODQGHUVRKXOGWU\ WR IRUP RI RXUFXOWXUHVFLHW\SRQLWLFDO DQG

SDUWLFXODUO\HGXFDFWLRQSUDFWLFWH6RFXOW XUHSOD\VDQHVVHQWLDO UROHUDWKHUWKDQRWKHUIDFWRUVVXFKDVGHY HORSLQJLQYHVWPHQWRU SURGXFWLYLW\ DW ZRUN ,Q RWKHU ZRUGVLQIRUPDWLRQ WHFKQRORJ\ ZLWK DQ DSSHDO WRK\SHUWH[XDOLW\ FRQWH[WV DOWHUV RXU HGXFDFWLRQDOSURJUDPVDQGEHKDYLRUV%HFDX VHLQK\SHUWH[WXDO VSDFWKHLQIRUPDWLRQDQGDWPRVSKHUHQHGH PRUHNQRZOHGJH DQGH[SHULHQFH%XWLQUHOLJLRXVHGXFDFWLRQ WKHVHSURFHVVHVDUH UHDOO\ GLIIHUHQW VLQFH WKH PDWHULDOV DUH IL[HG ZLWKRXW DQ\ PRGL\LQJ 1RZ WKH PDLQ TXHVWLRQ RI WKLW SDSHU LV ZKDWHU WKH FRQVHTXHQFHV DQG FKDOOHQJHV RI DSSHDOHQJ WR WKH K\SHUWH[WXDO LQ WKH IL[HG WH[WEDVHG UHOLJLRXV HGXFDFWLRQ SURFHVV 7KHVH FRQVHTXHQFHV DQG FKDOOHQJHV DOVR ZLOO EH H[SODLQHG LQ FRPSDUDWLYH SURVSHFWV D FRPSDUDWLYH VWXG\ RI FRQVHTXHQFHV RI DSSHDO WR WH[WXDOLW\ DQG K\SHUWH[WXDO LQ UHOLJLRXVHGXFDFWLRQ

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'XH WR WHFKQRORJLFDQ FKDQJHV DQG GHYHORSHPHQW WKH FRQFHSW QDWXUH DQG IXQFWLRQ RI WH[W DUH DOWHUHG 7RGD\ WKH UHDSHULVQRWOLPLWHGE\ZULWWHQKDUQDQGL [HGERRNWH[WV EHFDXVHK\SHUWH[WVDUHDQVRODQRWKHUVSDFH WKDWUHDGHULVUHODWHG

(OKDP6KLUYDQL*KDGLNRDHLVD3K'DQGLGDWHDW7HFK QLVFKH8QLYHUVLWLV %HUOLQHPDLOVKLUYDQHO#JPDLOFRP 6H\HG oDKGL 6DMMDGL LV DQ DVVRFLDWH SURIHVVUR DW 7DUELDWH oRGDUHV 8QLYHUVLW\7HKUDQ,UDQHPDLOVMDGLV#PRGDUHVDFL U WR WKHP 2I FRXUVH WKHUH LV PXFK PRUH GLIIHUHQFH EHWZHHQ WH[WWDQGH\SHUWH[WV 7KH WH[W LV EDVHG RQ WKH VHTXHQWLDO PHWKRG RI UHDGLQJ /DQGRZDQGHODQ\UHIHURWKHSULQWHGWH[W DVOLQHDU ERXQGHG VWUXFWXUH LQ FHUWDLQ ORJLFDQ IL[HG > S @ \$FRUGLQJ WR :LOOV WKH WH[W KDV D SDUWLFXODU IREFXV D FOHDUO\GHILQHGXGLHQFHQDQGDVLDQJOHYRLFH \$QRWKHUWHQHWRI WKH SULQW PHGLXP KDV EHHQ WKH FUHDWLRQ RI WKH FDQRQ WKH

FKRVHQ WH[WV DUH DVVXPHG WR FRQWDLQ WKH
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 WUXWKRIDGLVFLSOLQH%\VWD\LQJJDYDLODEOHL
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 WKHLUFHQWUDOUROH>S@%DVHGRQGLVWLQFWL
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 DQG WH[W¶ > S @ WH[W LV D PHWKRGRORJLFD
 ILHOG«D VRFLDO VSDFH WKDW GHFDQWV WKH
 ZRUN IURP LWV FRQVXPSWLRQ DQG JDWKHUV LW
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 :DWW¶VYLHZWKHPRVWVWDQGDUGWH[WGRFXPH
 QWVUDHFRQVWUXFWHG
 WREHUHDGOLQHDUO\IURPEHJLQQLQJSDJHWRHQ
 GLQJSDJH>S
 7RGD\K\SHUWH[WDOVRLVDQXQGHQDEOHS
 WRIOHDUQLQJ DQG WHDFKLQJ SURFHVVHV
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 UHDGLQJZULWLQJ DQG GLVFXUVLYHDFWLYLWLHV
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 DYLVWKH:RUOG:LGH:HEWKURXJK+70/,WZLOOLQF
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 EHFRPHWKHPHWKRGRIXWXUHFDVVURRPUHVV
 DUFKUHDGLQJ DQG ZULWLQJ SUDFWLFHV
 7KH WHUP RI K\SHUWH[W ZDV ILUVW DGYDQFHG
 E\ 7HG iHOVRQ LQ \$FFRUGLQJWR KLV
 YLVLQJ³K\SHUWH[W ZRXOG EH D
 G\QDPLFDQGLQWHUDFWLYHHQYLURQPHQWWKD
 WDOORZHG WKHXVHUWR FXVWRPLJH WKH
 SURFHVV RI UHWULHYLQJ DQG RUJDQLJLQJ
 LQIRUPDWLRQ IDFLDGLDGLQJ LQVWDQGDQJHRXV
 WUDYHUVDOR RI GLYHUJHQW WH[WXD
 PDWHULDOV DFURVV DQG WKURXJK
 GLVFLSOLQDU\ ERXQGDULHV
 >S@,WLVEDVHGRQWKHQVHTXHQWLDOPHWKR
 GRIUHDGLQJ DQ DFWLYH DQG JHQHUDWLYH PRGH
 RI LQWHUSUHWDWLYH SURGXFWLRQ DQG DW
 WKH VDPH WLPH ZRXOG SURYLGH D UHYHUVLEOH
 PHGLD LQ
 ZKLFKUHDGLQJ DQGLQJZRXOGEHLQWHJUD
 WHGLQWRDVLQJOH PXWXDOO\FRQVWLWXWLYH
 GLJLWDO IRUPDW > S @ 7KHSUHIL[
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 LQE\DNLQJ
 ZKDWLVLWVKDWK\SHUWH[WKDWVWKPDPNHVL
 WPRUHWKDWQH[W>S@

“hypertext is composed of blocks of words (or images) linked electronically by multiple paths, chains or trails in an open-ended, perpetually unfinished textuality described by the terms link, node, network, web or path” [7, p. 32].

6RPH WKLQNHUV WULHG WR
 FRPSDUH WKH K\SHUWH[W WR D

FRQVWUXFWLYLVWOHDUQLQJHQYLURQPHQWZKL
 FKLVSUHGLFDWHGLQμWKH ZD\V«NQRZOHGJH LV
 PHGLDWHG LQWHUSUHWHG DQG FUHDWHG
 WKURXJKLQGLYLGXDOV¶LQWHUDFWLRQZLWKWK
 HLUHQYLURQPHQW>S@ +\SHUWH[W LV EDVHG RQ
 LWV UHODWLRQDO PDWULFHV RI FRQHFWLYLW\
 DQG LQ WKH H[SHULPHQWDO GLYHUJHQW DQG
 FRQWLQJHQWFRQGLWLRQLQZKLFKWKDWFRQHF
 WLYLW\LVFDXJKWXS 6RPH RWKHU WKLQNHUV
 VXFK DV 3RVWHU > S @ ORXOWKURS DOVR WULHV
 WR FRPSDUH K\SHUWH[W WR 'HOHX]H DQG
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 \$FFRUGLQJ WR KLP K\SHUWH[W VHHPV WR
 FORVHO\ SDUDOOHO 'HOHX]H DQG *XDWWDL V
 QRWLRQ RI WKH UKL]RPH LQ LWV
 GHFHQWUDOL]DWLRQ RI QHWZRUNV RI
 LQIRUPDWLRQ DQG NQRZOHGJH LWV VKLIW IURP
 WH[WXDOLW\ WR DQ DFFHOHUDWHG
 LQWHUWH[WXDOLW\ DQG
 PXOWLWH[WXDOLW\DWGRZDUJXHVKDWK\SHU
 WH[W]HQDEOHV D SDUDGLJP VKLIW D PRYH
 WRZDUG D QHZ HSLVWHPRORJ\ DQG D PRYH
 WRZDUG SRVWVWUXFWXUDOLVW +\SHUWH[W
 V\VVHP PLPLF
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 QLQJHU EHOLHYHVWKDW

“To understand the text of a book, the reader must try to comprehend the ego and intentions of the author. In hypertext, the roles are reversed, and this is the essential intellectual challenges for the authors. The logic and organization are created by the user as he or she reads and interacts with the database” [11, p-51].

+\SHUWH[WJLYHVSHUPLVLRQWRUHDGHUVWR
 LQVHUWVKHPVHOYHV LQWR WKH PHDQLQJ
 FRQVWUXFWLRQ SURFHVV VLQFH WKLW PHWKRGR
 RI UHDGLQJ WU\ WR FUHDWH RZQ PHDQLQJ WKDW
 LW UHVXOWV LV PRUH
 FUHDWLYLW\IRUHDGHUV%LUNHUWVEHOLHYHV
 WKDW³HOHFWRQLF
 WH[W]DQGLK\SHUWH[W]LQSDUWLFXODULVNLOOLQ
 JWKHDXWKRU’>S@ +\SHUWH[W UHDGHUV
 KRZHYHU FDQ FKDOOHQJHV D WH[W
 LPPHGLDWHO\ RU DV LPPHGLDWHO\ DV WKH
 UHDGHU FDQ ZULWH D
 UHVSQVHDQGLQWKDWUHVSRQVHWRWKHDX
 WKRU¶VWH[W]RXFDXOW
 HPSKDVLRQWKHORRVHQLQJRIWKH³DXWKRU¶V
 RQVWUDLQW RYHU WH[W’>S@DQG K\SHUWH[W
 VHHPV WREHRQHZD\ LQ
 ZKLFKWKLVDQKSSHQ)ROORZLQJDUHWKHPDLQF
 KDUDFWHULVWLFV

RIK\SHUWH[WDFFRUGLQJWRLWVFRPSDULVRQZL
WKWKHWH[W

A. *Contrary to Text, Hypertext Has No Center, Beginning or Ending*

,QDK\SHUWH[WQHWZRUNWKHUHLVQRDQ\OLPL
WDWLRQWRUHDGLQ GLIIHUHQW SDUW RI WKH
WH[W LQ IDFWWKH UHGHUV KDYH PRUH
IUHGRP > S @ :KHQ RQH HOHFWURQLF WH[W LV
OLQNHG WR DQRWKHU WH[W RU ZKHQ RQH WH[W
LV FRSLHG DQG SDVWHG LQWR
DQRWKHUWKQRWLRQRIDVSDUDWLRQRIRUDGL
VWLQFWLRQEHWZHHQ
WH[WVVLPSO\HYDSRUDWHV>S@

B. *Hypertext Blurs the Distinction Between Author and Reader*

C. *Hypertext is Changing and Fluid, Not Fixed or Single*

%ROWHUVD\V³WKHUHLVQRVLQJOHVWRU\RIZK
LFKHDFKUHDGLQJ LV D YHUVLRQ EHFDXVH HDFK
UHDGLQJ GHWHUPLQHV WKH VWRU\ DV LW
JRHV:HFRXOGVD\WKDWWKHUHLVQRVWRU\DWDO
OWKHUHDUHRQO\

D. *Hypertext Is Collaborative*

+\SHUWH[W FDQ SXW WHDFKHU DQG
VWXGHQW FORVHU WR WKH VDPH
OHYHODQGHQFRXUDJHUHDGHUVWRGRPRUHUH
VHDFKQGVFKRODU
,QIDFWZLWKLQDK\SHUWH[WQHQLURQPHQWDOO
ZULWLQJEHFRPHV
FRODERUDWLYHZULWLQJGRXEO\VR

“The first element of collaboration appears when one compares the roles of writer and reader since the active reader necessarily collaboration with the author in producing a text by the choices he or she makes. The second aspects of collaboration appear when one compares the writer with other writers that are the author who is writing now with the virtual presence of all writers ‘on the system’ who wrote then but whose writings are still present.” [1, p. 88].

E. *Hypertext Is Democratic and Anti-Hierarchical*

7KH KLVWRU\ RI LQIRUPDWLRQ WHFKQRORJ\
IURP ZULWLQJ WR K\SHUWH[W UHYHDOV DQ
LQFUHDVLRQ GHPRFUDWL]DWLRQ RU
GLVVHPLQDWLRQ RI SRZHU :ULWLQJ EHJLQV
WKLW SURFHVV IRU E\ H[WHULRUL]LQJ PHPRU\
LW FRQYHUWV NQRZOHGJH IURP WKH
SRVVHVLRQRIRQHRIWKHSRVVHVLRQRIPRUHW
KDQRQH:ULWLQJ
FDQEHORQJWRDQ\ RQHLSXWVDQHQGWRWKHR
ZQHUVKLSRIVHOI

KDQGVIRIRUGLQDU\SHRSOHDUHSURYLQJWREHD
VXUSULVLQJIRUFH IRU GHPRFUDF\ UDWKHU
WKDQ WKH XOWLPDWH QLJKWPDUH RI
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7KHGHYHORSHPHQWRIQHZWHFKQRORJLHVDQG
WKHLUDSSOLFDFWLRQ
LQDQHGXFDFWLRQDOVHWWLQJLVERXQGWREULQ
JDERXWDZKROHQHZ
VHWRISRVLLELOLWLHVDQGSUREOHPV₂QHRIWK
HQHZWHFKQRORJLHV
WRFXUUHQWO\FKDOOHQJHVSKLORVRSKHUVRIH
GXFDFWLRQFDQEHIRXQG LQ WKH ULVH RI
HOHFWURQLF WH[W RU K\SHUWH[W > S @
+\SHUWH[WLVVLQGLQJLWVZD\LQWRPDQ\GLIIHU
HQWVSHFVWRIRXU
OLYHVIURPWKHFODVVURRPWRKRPHWRZRUN7KL
VQHZPRGHRI
SUHVHQWLQJLQIRUPDWLRQSURPLVHVWRFKDQJ
HWKHZD\ZHUHDGDV ZHOO DV WKH ZD\ ZH
SXUVXH DQG XQGHUVDQG NQRZOHGJH DQG
EHFDXVH LW LV EHFRLQJ LQFUHDVLRQO\ XVHG
IRU HGXFDFWLRQDO
SXUSRVHVLWVHHPVLPVSHUDWLYHWKDWZHFUDH
IXOO\FRQVLGHUVRPH
RIWKHVHHSVLVWHPRORJLFDQFKDQJHV

+\SHUWH[W V\VVHPV DQG K\SHUWH[WXDQ
OHDUQLQJ FKDOOHQJH
FRQYHQWLQJQDOWUDGLWLRQDODVXPSWLRQVD
ERXWVKHUROHDQGVWDWXV RI WHDFKHU WKH
DXWKRULW\ RI WKH FRQWHQW WKH PHWKRGV RI
WHDFKLQJOHDUQLQJ WKH YDOXH DQG
SRVLWLRQDOLW\ RI NQRZOHGJH DQG WKH
SRVLWLRQDOLW\ RI WKH
SUDFWLWLRQHUVXEMHFW LQ UHODWLRQ WR
NQRZOHGJHLQIRUPDWLRQDQGSUDFWLQH,QIRUP
DWLRQWHFKQRORJ\
FKDOOHQJHVDQGUHVKDSHVWKHFRQWRXUVRIW
KHLQVWLWXWLRQVZKHUH SHGDJRJLFDQ
DFWLYLWLHV WDNH SODFH 7KHVH FKDOOHQJHV
DOVR VLPLODUO\ H[WHQG WR WUDGLWLRQDO
FRQFHSWLRQV DQG YDOXHV
VXUURXQGLQJWH[WXDQDQGFDFQRQLFDQDQXWR
ULW\7KHFRQYHQWLQJQDOWUDGLWLRQDQGSUDFWLQH,QIRUP
WHFKQLTXHV LQYROYHG LQ GLVWLOOLQJ
GHVLUHGXWFRPHV DQG WKH UHLILHG
GLVWLQFWLRQV RI DXWRQRPRXV GLVFLSOLQHV
RU FRQWHQW DUHDV \$PRQJ WKHP K\SHUWH[W
DOVR HQFRXQWHUV WKH UHOLJLRXV IL[HG
WH[W ±WKDW HQMR\V WKH VWDWXV RI
UHIOHFWLQJ DQ DXWKRULWDLYH GLYLQH DQG
FDQRQLFDO WUXWK ZLWK FKDOOHQJHV :KLOH
SULQWHG DQG IL[HG UHOLJLRXV WH[WV GLUHFW
WKHEHOLHYHUVWRORRNQZDUGLQWRWKHFRP

PXQLW\DQGWIRVWHU WKH SUHVHUYDWLRQ RI
 WKH WH[W\WXDO WUDGLWLRQ WHFKQRORJLFDQ
 LQQRWDWLRQV HQDEOH LQWHQVLYH
 LQWHUDFWLRQV WKDW FURVV WKH ULJLQ
 ERXQGDULHVRIWKHFRPPXQLW\LWVHOI:LOOVEH
 OLHYHVWKDW
 +\SHUWH[W OLQNV LQIRUPDWLRQ WKURXJK
 DVVRFLDWLRQV DQG QRW VHTXHQWLDQ\ DQG LV
 SRZHUHG E\ K\SHUOLQNV ZKLFK DOORZ WKH
 UHGHU WR VNLS WR DQRWKHU ORFDWLRQ RQ
 WKH ZHE +\SHUWH[W
 WKHUHIRUHEUHDNVWUDGLWLRQDOKLHUDUFK\
 DPRQJWH[WVDQGVHHPV WR FRQILUP WKH
 FULWLFDO QRWLRQV DERXW WKH HOXVLYH
 ERXQGDULHV
 EHWZHHQWH[WVDQGWKHTXHVWLRQDEOHDXWK
 RULW\RIDXWKURV>S @
 %DVHG RQ /DQGRZ\V YLVLQ RI
 K\SHUWH[WK\SHUWH[W LV FRPSRVHG E\ WUDLO
 SDWKV« WKH VHTXHQWLDQ YHUWLFDO RU
 KLHUDUFKLFDO SURFHV RI UHGLQJ D ERRN LV
 QR ORQJHU
 QHFHVVDULO\LQYROYHG>S@+RZHYHUK\SHUWH[W
 WWHQGVWR
 HOLPLQDWHKLHUDUFKLFDOGXDLVWLFGLVWLQ
 FWLRQVDQGOHDGVDVWXGHQV DZD\ IURP WKH
 QDUURZ DQG HVVHQWLDOLVW YLHZ RI
 NQRZOHGJH
 +\SHUWH[WEOXUVWKHGLVWLQFWLRQEHWZHHQ
 DXWKRUVDQGOHDGUVLVW PRYHV WKH IRFXV
 DZD\ IURP WKH DXWKRULW\ RI WKH DXWKRU
 VXJJHVWLQJ LQVWHDG WKDW PXOWLSOH
 LQWHUSUHWDWLRQV DUH HTXDOO\
 SRVVLEOHDQGYLDEOH>S@,WGRHVHHPDVWKRXJ
 KWKH IRFXV DZD\ IURP QDUUDWLYH IRUPV DQG
 WKH PRYH WRZDUG PXOWLSOH YRLFHV ZLOO
 OHDG WR D NLQJ RI µGHDWK RI DXWKRU¶ LQ
 ZKLFK PRUH HPSKDLV ZLOO EH SODFHG RQ
 UHGHUV DQG DOVR LV
 PRYHVXVWRZDUGUHODWLYLVWLFHSLVWHPRORJ
 LFDOSRVLWLRQV>S @
 :HDNHQLQJWKHUOHDQGVWDWVRIWKHWHD
 FKHUDVWUDQVPLWWHU RI NQRZOHGJH DQG
 LQIRUPDWLRQ LV WKH RWKHU FKDOOHQJHV RI
 K\SHUWH[W,Q'XQFDQ¶VYLVLQWKHEOXLQJRIFOH
 DUOLQHV EHWZHHQ DXWKRUV DQG UHGHUV
 OHVVHQV WKH LPSDFW RI \HDUV RI
 WUDGLWLRQDO PHDQV RIHGXFDFWLRQ WKHLGHD
 WKDW HGXFDFWLRQ LV VLPSO\ WKH
 WUDQVPLVLRQ RI LQIRUPDWLRQ >S @ 6RPH
 K\SHUWH[WV FULWLFV EHOHYH WKDW WKH
 K\SHUWH[W UHGHU PLJKW IOLW
 EHWZHHQWKHUHVZLWKJUHDWUHDVHDQG\
 HWWWLOOQRWSHUFHLYH

WKHVKDSHRIWKHZRRGDQ\EHWWHUWKDQEHIRU
 H>S@
 *RLQJ WR EH\RQJ RI WH[W DQG HVFDSH IURP
 LWV SRZHU DQG FRQWURO DOVR LV WKH RWKHU
 FKDOOHQJHV RI K\SHUWH[W +\SHUWH[W DOORZV
 DQG HQDEOHV VWXGHQV WR PDNH WKHLU RZQ
 PHDQLQJ WR
 ILQGWKHLURZQZD\LQWRWKURXJKVHQGLQJRXWR
 IDWH[W>S @
 %DVHGRQDERYHFKDUDFWHULVWLFVDQGFKDO
 OHQJHVRIK\SHUWH[W IRU HGXFDFWLRQ
 UHOLJLRXV HGXFDFWLRQ DOVR LV VXEMHFW WR
 VRPH
 FKDOOHQJHV%HFDXVHWKHUHDUHVVRPHFRQWUD
 GLFWLRQVEHWZHHQWKH
 SULQFLSOHV RI UHOLJLRXVHGXFDFWLRQ DQG
 K\SHUWH[W K\SHU
 WH[W\WXDOLW\ 2QH SULQFLSOH RI UHOLJLRXV
 HGXFDFWLRQ LV WKH DXWKRULW\ RI UHOLJLRXV
 WH[WVXFK DV %LEOH .RUDQ RU ZKDW
 *RGVDLGRUVHQVWRKXPDE\3URSKHW,QWKLVSU
 LQFLSOHWKH YDOXH VXUURXQGLQJ WH[W\WXDO
 DQG FDQRQLFDO DXWKRULW\ PXVW EH
 UHVSHFWHG %HFDXVH ZKDW DUH LQ WKH
 UHOLJLRXV WH[W DUH GLYLQH FDQRQLFDO
 WUXWK DQG GHULYHG IURP WKH \$OPLJKW*RG ,Q
 K\SHUWH[WK\SHUWH[W\WXDOLW\ WKH
 DXWKRULW\ RI FRQWHQWWH[W LV
 EURNHQDQGGPHDQLQJOHVV
 7KH RWKHU SULQFLSOH RI UHOLJLRXV
 HGXFDFWLRQ LV WKDW UHOLJLRXV
 HGXFDFWLRQSURJUDPLVEDVHGRQ3URRWDUERUH
 VFHQFHPRGHO' > S @ DQG DFRUGLQJ WR WKH
 LGHD RI URRWDUERUHVFHQFH WKHUH
 DUHSULRUFHQWUDOLW\FHQWUDODXWKRULWD
 WLYHUROHDQGWWRWDOLWDULDQ
 FRQWURORIDXWKRUWHOOUH*RG3LRXVHOLWHVR
 QUHOLJLRXVWH[WWRU
 LQWKHRWKHUZRUGWKHUHDUHEHJLQQLQJDQGH
 QGLQJIRUDOOWH[W %XW LQ K\SHUWH[W\WXDO
 VSDFH WKHUH LV QR EHJLQQLQJ HQGLQJ XS
 DQGRZQIRUWH[WWDQGDQOWH[WLV3XQVWDEOHU
 HVVHOVVDQGSURQH'
 >S@,QK\SHUWH[WVSDFFHWKHUHDUHVPRUHSRVLE
 LOLWLHVIRU
 WKHUHDGHUIRU3PHDQLQJPDNLQJ'>S@DQGRQH
 DQKDYH RQH¶V 3RZQ PHDQLQJ' > S @ IRU DOO
 WH[W 7KHUHIRUH WKH PHWKRQ RI UHGLQJ LV
 QRQVHTXHQWLDQ DQG WKH PRGH RI
 LQWHUSUHWDWLYH SURGXFWLRQ LV DFWLYH
 DQG JHQHUDWLYH %DVHG RQ WKH UXOH RI
 µPHDQLQJ PDNLQJ DQG RZQ PHDQLQJ NQRZOHGJH
 DOVRLVPHGLDWHGLQWHUSUHWHGQDGFUHDWH
 GWKURXJKLQGLYLGXDOV¶ LQWHUDFWLRQ ZLWK

XVDEOH WKH WH[W DQG K\SHUWH[W LQ
 UHOLJLRXV HGXFDWLRQ DQG GHFUHDVLQJ LWV
 WKUHDWHQLQJ FKDOOHQJHV LV WKH PDLQ
 UHVSQRVLELOLW\ RI HGXFDWLRQDO
 SUDFWLWLRQHUVWHDFKHU
 FXUULFXOXPQGHVJQHVDQGHGXFDWLRQDOSODQ
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@ 6WXGLHV7KH6WDWHRI$UW0,73UHVV&DPEULGJH
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@ WLRQ
  IRU/LEUDULDQV7KH-
  RXUQDORISFDGHPLF/LEUDULDQVKLS9RO1R
> %DUWKHV 5 )URP :RUN WR 7H[W],PDJH
@ 0XVLF
  7H[W7UDQV6+HDWK+LOODQG:DQJ1HZ<RUN
> 0F.QLJKW & 'LOOLRQ $ DQG 5LFKDUGVVRQ - 8VHU &HQWHUHG
@ 'HVLJQ RI +\SHUWH[W DQG +\SHUPHGLD IRU (GXFDFWLRQ
  +DQGERRN RI
  5HVHDUFKQ(GXFDFWLRQDO&RPPXQLFDWLRQVQDQJ7HFQR
  ORJ0DFPLOODQ 1HZ<RUN
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