



VHQWHQFHV EXW LQFOXGHV WKH FDVH DQG HHOHQWLRQDFULWJGLQJ R  
 FRQWHQW WR PDLQWDLQ WKH LQWHJULW\ DQG QDWXUDO IORZ RI WKH  
 PDWHULDO ZKLOH HQVXULQJ WKDW LW UHPDLQV DFFHVVLEOH  
 6LPSOLILHG WH[WV DUH RIWHQ UH\LVHG WR LOFOXGH PRUH FRPPRQ  
 YRFDEXODU\ IHZHU LGLRPDWLF HISSUHVVWRU RU SDVYLROH DERUDW  
 FRQVWUXFWLRQV ZKLOH VWLOO HFRQGHODQJXWKH\ HVVDFHWLQJ  
 LQIRUPDWLRQ 7KH JRDO LV WR OYDUHQHU D WR ODQJHJH SUBYRDOJLQJ  
 PDWHULDOV WKDW ERWK HQJJDJH UYDOHQGHU DWRU DQJHJH SRUWJLQJ  
 OLQJXLVWLF DGWDEDXPHQW ZLWK FRXUVWUDWLRQ JURXS DFWLYLWLHV  
 RU ORVV RI PRWLYDWLRQ > @ WKURXJK OLQJXLVWLF FKDOOHQJHV R

&RQWH[WXDOL]DWLRQ RI ,QSXWKURXJK SUREOHP VROYLQJ DQG QHJ

7KH FRQWH[WXDOL]DWLRQ RI LQSWLGH FRXQDODV DNRQJ &ROO  
 ODQJXDJH DFTXLVLWLRQ UHOHYDQV DQGSDFHDFW\XOSDLWPHQDWLQV P  
 %\ HPEHGGLQJ ODQJXDJH ZLWKLQDFRQVWUDWLRQV DWRU DQJHJH  
 UHODWDEOH RUDXWFRQWUDWLRQV DWRU DQJHJH UHODWDEOH RUDXWFRQWUDWLRQV  
 ERWK WKH UHWHQVLRQ DQG ERZSHQWFLV VCDUHG OHDUQLQJ H  
 FRQVWUXFW )RU H[DPSOH ZKHQXSURUFRHEDXQV DWRU DQJHJH  
 LQWURGXFHG WKURXJK D VWRU\FRQZLWQFRVWUDWLRQV DWRU DQJHJH  
 IDPLOLDU WRSFLV VWXGHQWV DWRU DQJHJH SDFHDFW\XOSDLWPHQDWLQV  
 PHDQLQJ DQG PDNH DVVRFLDWLRQV DWRU DQJHJH SDFHDFW\XOSDLWPHQDWLQV  
 H[SHULHQFHV 5HDOLVWLF GLDORXVYLQJRXODWLRKHFRPPRQH\RI PD  
 LQWHUDFWLRQV WKEHEGROWMLRQV FRXQVXUDWRUDOHDFWLRW SXWDLV  
 HOHPHQWV ZLWKLQ ODQJXDJH WHDFKLQJ VXSSRUW WKLV HQGHYRU  
 6XFK FRQWH[WXDO OHDUQLQJ QRW RQO KHOSV LQ XQGHUVDQGLQJ  
 WKH GLUHFV PHDQLQJ RI ZRUGV DQGSURSHUFRHEDXQV DWRU DQJHJH  
 JUDVSLQJ VXEWOH QXDQFHV WKDW DUH RIWHQ SODXUH VSHFLXOD  
 7KLV HQVXUH WKDW ODQJXDJH SODXUH QJWRU\DFWLRQV WKHJWV U  
 PDVWHU\RI JUDPPDU DQG YRFDEXODU\ DWRU DQJHJH SDFHDFW\XOSDLWPHQDWLQV  
 SUDFWLFDO FRPPSHQVWVHY)XDFWLRQV PHDQLQJ XVLQJ WKH WDU  
 VLWXDWLRQDO DQJHJHFRHEDXQV DWRU DQJHJH SDFHDFW\XOSDLWPHQDWLQV  
 SUDFWLFH ODQJXDJH WKURXJK FRGH\SDUHQV DWRU DQJHJH SDFHDFW\XOSDLWPHQDWLQV  
 VROYLQJ LQ VLPXODWHGHFRXU\WKHJWVDFWLRQV DWRU DQJHJH SDFHDFW\XOSDLWPHQDWLQV  
 SDUWLFVSDWLRQ DQG GHSHU FRPSHWQFH DWRU DQJHJH SDFHDFW\XOSDLWPHQDWLQV  
 ODQJXDJH > @ ODQJXDJH UHVRXUFHV FUHDWLYHO\ :

OXOWLPHGLD DQG 9LVXDO \$LGH[SHULPHQW ZLWK GLIIHUHQW UHJL

JUDPPDWLFDO VWUXFWXUH 7KH XQ  
 ,QFRUSRUDWLRQ PXOWLPHGLD DQGLQVXUPLGHYHMQWFRQVWUDWLRQV  
 LQVWUXFWLRQ LV DGGWHPV LGZDHWLQYH OHDUQLQJ WULWKHU DEUHIRWANG I  
 SUHIHUHQFHV DQG VXVWDLQ OHDUQLQJ HUJDUFRDWLRQV JHQVHU VHU  
 FKDUV DQG LOOXVUDWLRQV FRXQVXUDWRU\XFKWRQDFKRM DWRU DQJHJH  
 PHRU\ PDNLQJ DEVUDFW RU QHJSHUFRHEDXQV DWRU DQJHJH SDFHDFW\XOSDLWPHQDWLQV  
 9LGHV DQG LQWHUDFWLYH VRIWZLQJ SURVRIQV SDUHQW HDQDFWLRQ  
 HQDEOLQJ OHDUQLQJYHFRHEDXQV DWRU DQJHJH SDFHDFW\XOSDLWPHQDWLQV  
 QXDQFHV WKDW FRPSOHPHQW DXGLWFRHEDXQV DWRU DQJHJH SDFHDFW\XOSDLWPHQDWLQV  
 ULFK HQYLURQPHQW VXSSRUW FRXQVXUDWRU\XFKWRQDFKRM DWRU DQJHJH  
 H[SHULHQFHV DQG SDFHDFW\XOSDLWPHQDWLQV DWRU DQJHJH SDFHDFW\XOSDLWPHQDWLQV  
 WR HQFRXQWHU DQG SUDFWLFH ODQJXDJHFRHEDXQV DWRU DQJHJH SDFHDFW\XOSDLWPHQDWLQV  
 \$GGLWLRQDO\ WKH XVH RI WHFKSURSHU\QWKHFRHEDXQV DWRU DQJHJH SDFHDFW\XOSDLWPHQDWLQV  
 DV ODQJXDJH OHDUQLQJ DQGSZKLWFRHEDXQV DWRU DQJHJH SDFHDFW\XOSDLWPHQDWLQV  
 RQOLQH UHVRXUFHV LQWURGXFHV OHDUQLQJ WR D YDULHW\RI VSRNH  
 DQG ZULWHWQ ODQJXDJH LQSWV VLPXOWDQHRXVO\ 7KLV QRW RQO\  
 UHLQIRUFHV WKH LQGHUHQVLRQ LQVWUDWLRQ LQVWUDWLRQ DQG 'HEDWHV  
 SUHSDUH WKHP WR QDYLJDWH WKH PXOWLPHGLD ODQJXDJHFRHEDXQV DWRU DQJHJH SDFHDFW\XOSDLWPHQDWLQV  
 UHDO ZRUOG ODQJXDJH XVH %\ SRZHU\XO PRUH OHDUQLQJ DQG GLVFXVV  
 LQWHUDFWLYH ZD\V WR OHDUQLQJ DWRU DQJHJH SDFHDFW\XOSDLWPHQDWLQV  
 PXOWLPHGLD DQG YLVXDO DLGV ODQJXDJHFRHEDXQV DWRU DQJHJH SDFHDFW\XOSDLWPHQDWLQV  
 WUDGLWLRQDO WHDFKLQJ PHWKFRHEDXQV DWRU DQJHJH SDFHDFW\XOSDLWPHQDWLQV  
 KROLVWLF ODQJXDJH OHDUQLQJ OHDUQLQJ DWRU DQJHJH SDFHDFW\XOSDLWPHQDWLQV



DFTXLVLWLRQ L@ \ D V P L U F X E M X U S H G H A M U O F I Z L R M K W H F K Q R O R J \ D Q G P X O W I  
 V L P S O H U W D V N V W K D W U H T X L U H H P D M L F H G D O V X D J F U X N L D O V F R P S R L Q C H Q U V  
 F D Q H [ S H U L H Q F H H D U O \ V X F F H V L Q H W U Z K E W K R Q R Q W J Q L E I X M C H D V R K L I W W  
 E X L O G L Q J W K H L U F R Q I L G H Q F H S \$ U V R Q C O L D B G Y D E B H Q L V K H [ S H U L H Q F  
 F R P S O H [ L W \ R I W D V N V H V F D O D W H G L Y H H U T X L U L Q Q J W K H F W L R Q D O D D M H I F K O R B I C  
 P R U H V R S K L V W L F D W H G O D Q J X D J H Q D V P U L F F W D Q I G H W X D S S R U F R L J C L W Q Y B U Q L  
 S U R F H V V H V ) R U L Q V W D Q F H L Q P W W D O D W B V N D Q Q E L F K D O O R H Q X V H V R Q H D U Q  
 Y R F D E X O D U \ D F T X L V L W L R Q D Q G O D Q W X I D J H S U R F Q V F L L H Q F F A L R Q Y Z I K V O B U F  
 V X E V H T X H Q W W D V N V P L J K W L Q W H Y J U D W H H L W K H E V H F R P O N P I H Q F W H D L Q V O B O \  
 S D U D J U D S K Z U L W L Q J R U V S R Q W D O F P E X L Q G W D B Q J R H W L K D U R L X K R O D O V D Q G  
 J U D G X D W H G D S S U R D F K V W X G H Q W Q G H V S H P O H G L F E D O O X I Q S D H Q J W K H G L U Q  
 O L Q J X L V W L F U H S H U W R L U H D Q G D G I P O B V L R O L N H R O \ O M H U E C H B Y H U Z K F I O P W  
 E \ G L I I L F X O W \ V S L N H V 7 K H V H T G X H F D V L Q R Q D O K L R \ K I R O D I E V O H I L F Y L H Z Q R  
 H G X F D W R U V W R V F D I I R O G O H D U G L H F J L V E L R S U R Y I X G L Q D J O D B S B B S O M D W S I S D  
 V X S S R U W D W H D F K V W D J H R I W L Q H Q R O Y H D V L Q R Q J L Q S O B S U J D F W H H W W V D F R O V X  
 I D F L O L W D W L Q J D V P R R W K H U W U D Q H V L W L R Q W B H K H J K H S S O B Y W B Q D Y Q O D  
 7 K L V F X P X O D W L Y H O H D U Q L Q J W U R D M D G W R Y H U Q R R V Q Q H O W L Q R J O Z C R W O G V 7  
 I R X Q G D W L R Q D O N Q R Z O H G J H E X W D O R F D W B M S I U D F F R Q W E H O W E M R G U B V H  
 D W W D L Q P H Q W D Q G H I I L F D F \ L Q S D D B W D F H X L Q H V D K H H S K K W X D W N R I U  
 E X L O G V R Q W K H S U H Y L R X V R Q H P H O H K R G L Q R W L R H D R O K H L P D O M H O D Q F R Q W  
 F R P S U H K H Q V L Y H O D Q J X D J H O H D U Q L Q J X H [ S H U L H Q F H L Q @ L V D Q H Q U L F K  
 H [ S H U L H Q F H I R U D O O

5HIOHFWLRQ DQG 6HOI DVVHVVPHQW

5HIHUFH

(PEHGG LQJ UHIOHFWLRQ DQG VHOI DVVHVVPHQW LQWR WKH  
 IUDPHZRUN RI / OHDUQLQJ HTXLSV H O H D Q H U Y D Q L W U F U B W G F R R H Q J F K  
 W R R O V I R U P R Q L W R U L Q J W K H L U R Z Q S W R F R D G V O D Q G X G H H D F R S L Q L W L R Q  
 J U H D W H U G H J U H H R I V H O I D Z D U H Q H U H V H H U P K G B O H Q V K H L Y R O H Q J X D J H Q J  
 D E L O L W L H V % \ U H I O H F W L Q J R Q W K H R X W F R P H R I O D Q J X D J H W D V N V  
 O H D U Q H U V F D Q L G H Q W L I \ D U H D V R I V W U H Q J W K B W R F H Q H E U D W H D Q G  
 D U H D V L Q Q H G R I L P S U R Y H P H Q W W B W D U J H W D F Q X V W X U H O H D U Q L Q W  
 H Q G H D Y R U V 6 H O I D V V H V V P H Q W F D Q W D N H Y D F L R X X J R U P V Y X F K L Q W  
 D V F K H F N O L V W V U X E U L F V R U H Y H V H O I U D W L Q J V F D O H V Z K L F K  
 D O O R Z O H D U Q H U V W R F U L W L F D O O \ H Y D O X D W H W K H E Q S H U R P K G H H  
 D J D L Q V V S H F L I L F F U L W H U L D 7 K H S R R P H V Q X D P H L O W D L Q L R Q \$  
 U H I O H F W L Y H M R X U Q D O V L V D Q R W K H U X S R Z H U X O V W U D W H J \ L Q Y L W L Q  
 O H D U Q H U V W R D U D Q G X O H V O L Q W K R D E R W Y W K H L S D V X O R Y = X E D I G X O O R  
 O H D U Q L Q J M R X U Q H \ > @ 7 K L V U H I O H F W L Y H ) D S D G V L R Y Q R W R O O X H Q  
 H Q F R X U D J H V O H D U Q H U V L S W R I W K H L U Z D G K X Q W H Q J O L V K D Q G V H F R Q G  
 G H Y H O R S P H Q W E X W D O V R H Q K D Q F H Y K W R B W L D V E L R O L W O D G F R H S S U V  
 J R D O V V W U D W H J L J H O H D U Q L Q J S D V K L R D Q G U H F R R Q L H S W K H R H W  
 L Q W H U S O D \ E H W Z H H Q H I I R U W D Q G R X W L F R P H Y L R P H R K H E V W K H H D F K L  
 P H W D F R J Q L W L Y H V W U D W H J L H V S U H S I D V - R X U D O D R Y J R O W G L V R S O L C  
 O D Q J X D J H D F T X L V L W L R Q D V W K H \ E H F R P H D G H S W D W D G M X V W L Q J  
 W K H L U O H D U Q L Q J H H S S U Y R D F K L Q V W R D O O H Q J H V D Q G H W D O 7 K H Z K D W  
 R S S R U W X Q L W L H V 7 K U R X J K F R Q V L V H O H U J H P H Y E W H F R Q D Q G O H D U Q L Q J  
 D V V H V V P H Q W O H D U Q H U V W U D Q V I R S P H E W D W R O P E R F O H O D D U Q L Q J  
 X V H U V F D S D E O H R I D G D S W L Q J W K H L U V N L O O V W R D Z L G H D O U D A R I  
 F R P P X Q L F R O W M H W V > @

&RQFOXVLRQ

&DVWLOOR ORQWRID OLODJURV 3L  
 VWUDWHJLHV IRUK GHDHFKM QW WKZRH  
 RI KLJKHU HGXFDWLRQ

, Q FRQFOXVLRQ WKH DUUD\ RI SHG &HORI D V R Q H D Q G X U N \* R U W H U  
 L Q W K L V D U W L F O H K L J K O L J K W V W K H W K L O R X J K F D W H G D Q G Y D U L H G Q D W X O F  
 V H F R Q G O D Q J X D J H D F T X L V L W L R Q H P S K B L L Q J W K H Q H G I R U D  
 P X O W L I D F H W H G D R O F K H Q J U R I E Q H Q V S S I D Q W R K H - X O L D \$ P H O L D 6 L P R H V  
 F R P S U H K H Q V L E L O L W \ R I L Q S X W W R D U R D W L G U L Q U H P H D Q L Q Q R O D W L Y H  
 L Q W H U D F W L R Q D P R Q J O H D U Q H U V I L R K L I K H U L G X F R O W L R W H Q W L Q U D V X  
 Q X D Q F H G I H H G E D F N W R L Q F R U S R U D I W L U J H I G X H D W L Y R I Q W D R Q D E D V H G  
 D F W L Y L W L H V H Y H U \ V W U D W H J \ X Q G H U V F R U H V W K H L P S R U W D Q F H R I  
 D G D S W L Q J W R W K H Q H G V D Q G S U H I H U H Q F H V R I / O H D U Q H U V 7 K H