

:KDW UROH GR PHFKDQR PRGXODWRU\ SDWKZD\ SOD\ LQ
FDQ WKHVH SDWKZD\ EH WDUJHWHG IRU WKHUDSHXWLF

.DWH .LP 9HWHULQDU\ 6WXGHQW 5R\DO 9HWHULQDU\ &R

2VWHRDUWKULWL LV D FKURQLF GHJHQHUDWLYH GLVHD
FRPSOHWHO\ XQGHUVWRRG (YHQ WKRXJK LW LV WKH PRV
DGXOWV WKHUH DUH FXUUHQWO\ QR WKHUDSHXWLF WUH
SDLQ ORVV RI IXQFWLRQ DQG OLPLW IXUWKHU SURJUHVV

2VWHRDUWKULWL SURJUHVVLRQ LQYROYHV D UHWXUQ W
IRHWDG GHYHORSFHQW ERQH V IRUP E\ HQGRFKRQGUDO F
F HWVWLP E O\ P EL 'HH W

FRPSOH[LW\ DQG FRRUGLQDWLRQ UHTXLUHG GXULQJ HQG
LQDSSURSULDWHO\ DFWLYDWHG LQ WKH DGXOW LW PD\ U

0HFKDQLFDO FXHV VXFK DV WKRVH H[HUWHG GXULQJ HPE
VNHODWDO GHYHORSFHQW > @ 7KH P725 PDPPDOLDQ 7D
SOD\ DQ LPSRUWDQW SDUW LQ VHQLWLVDWLRQ WR PHF
RVVLILFDWLRQ > @ 1) % QXFOH DU IDFWRU NDSSD OLJKV
P725 SDWKZD\ LQWHUDFW ZLWK HDFK RWKHU DQG H[KLEL
PDWXUH SK\VLRRJLFDQ SURFHVVHV > @ 7KHVH PHFKDQ
HPEU\RQLF ERQH IRUPDWLRQ DQG KDYH EHHQ LPSOLFDFW
RVWHRDUWKULWL

\$ ORW WKDW UHPDLQV XQNQRZQ DERXW WKH UROH RI PHF

HPEU\RVYRQ WLELRWDUVDO ERQH V ZHUH DQDO\VHG E\ F

0HWKRGV

&KLFN HPEU\RV ZHUH XVHG DV LQ YLYR PRGHQV DV WKH
GHYHORSFHQW DQG DUH HDV\ WR WUHDW DQG PRQLWRU
HPEU\RV ZHUH WUHDWHG WZLFH ZHHNO\ GLUHFWO\ WR WK
OHXFLQH UDSDP\FLQ EHWXOLQLF DFLG RU 6&)RU W
DQG UDSDP\FLQ LV DQ LQKLELWRU 6LPLODUO\ IRU WKH
DQG 6& LV DQ LQKLELWRU (PEU\RV ZHUH HXWKDQL]HG
ZHUH FROOHFWHG IRU PLFUR FRPSXWHG WRPRJUDSK\ PL

0LFUR &7 VFDQV ZHUH WDNHQ XVLQJ D 6N\VFDQ PLFUR
ZHUH UHFRQVWUXFWHG XVLQJ 15HFRQ DQG DQDO\VHG XV
DQDO\VLV ZDV SHUIRUPHG XVLQJ *UDSK3DG 3ULVP '¶\$J

ZD\ \$129\$ DQG WZR YDULDEOH FRPSDULVRQ W WHVWV ZH
FRQVLGHUHG VWDWLWVWLFDOO\ VLJQLILFDQW

+LVWRORJ\ VDP SOHV ZHUH SURFHVVHG DQG VWDLQHG DF
SURWRFRO)LJXUH 1R DQDO\VLV RI KLVWRORJ\ VDP SO
WKLW SURMHFW

:RUNLQJ RQ WKLW SURMHFW ZDV D XQLTXH RSSRUWXQLW\
HQYLURQPHQW DQG SUDFWLFH WHFKQLTXHV DQG SURWRP
VWXGHQWV KLS ZDV PDGH SRVVLEOH E\ WKH V\PSRVLXP W
0LFKHOO , DP JUDWHIXO WR 6RUDLD 6LOYD DQG 3URIHV
ZRXOG QRW KDYH WKLW RSSRUWXQLW\ 7KDQN \RX

5HIHUUHQFHV

3LWVLOOLGHV \$\$ DQG %HLHU) &DUWLODJH ELRORJ\
GHYHORSPHQWDO ELRORJ\ 1DW 5HY 5KHXPDWRO
1RYLFN\ \$ &DHWDQR 6LOYD 63 -DYDKHUL % DQG 3LW
6NHOHWDO 'HYHORSPHQW ,Q 6WRGGDUW 0- 'HYHOR
7LVVXH (QJLQHULQJ VW (G \$FDGHPLF 3UHV
=KDQJ < DQG -RUGDQ -0 (SLGHP 3\$ 3\$ @S G

3\$ ð `DU DQG 3LWVL@OOLGHV \$/G NHKD ELROS2@°@@@ÀÐ
3\$ ð `DU €W DO P RR,,@p€LSP`hP Zf` GHYHO xD pDOP3\$[DQ

HW