

# Ինչպե՞ս Մեզ Կրթել

Educational Research

EDM 1205

Գրող՝ Գր. Կարեն Կարենյան

Գրքի Գրքեր



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# Ինքնուրույն Կրթություն

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Գրքերի Կրթություն

# Ինկյն ՄթեԼ Կն

EDM 1205

## Գգ ԳՄ ԺժՄՅ

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### ՇՅՅ

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### ՇՔԿԿԵԺԻ

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ՄՆՐԿԵԻ- 1705|

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30/1/Կ, ԺԺԺԺՅՅՅՅՅՅՅՅՅՅՅ

ԿՆԿՆ|

**tkum@B AbyiY Kivi KivRi ciugk©**

**ucq ukqvu\_**

Dyg ukLb cxiuz ubfP GgGW ukqvu tcumMtg fuzni qvi Rb" `z Ae GWzKkb AvcbtK AvSht K Awfb`b RvbrtPQ|  
**ukyv MtelYv** (EDM 1205) tkum@eBiu Gg GW tcumMtg Gkuu Aveuk`K tkum@ GB tkvtmP Dtk` ukyv kv\_xq  
MtelYv cvi Prj b mauiKZ avi Yv jvf AvcbtK mrvqZv Kiv| Avkv Kiv nq`Q GB tkum@ktl Avcub ukyv e`e`vi weifbe  
ir `Ki wektl Y I chfj vPbv KvtR weifbeMtelYv cxiuz cOqvM matU`uo avi Yv jvf Kti cieZfZ tckv ubfP MtelYv  
KvtR maui<sup>3</sup> nteb| eisjv`tki ukyv e`e`vi weifbeir `Ki DbnzKti mgm`vtKw`K Ges tgsuj K MtelYv Kiv GKvsl  
cOqvRb GB Dcjwa Avcbt`i mevi gta` Rvmte Ges Avcbvuv ukyv mauiXq mgm`v Aeja`fb MtelYv KivR cvi Prj bv  
Kitz AvMh cKvk Kiteb GB Avkv e`<sup>3</sup> KtiB GB tkum@B Gi welqe``ibaY Kiv nqtqQ|

G tkum@eBiu ciV` welqe`tk Avgiv Oqiu BDubtu fvm KtinuQ| GtZ maui<sup>3</sup> nqtqQ ukyv MtelYv avi Yv, `enkó, ckviff`,  
Dcki YBZ`w` mauiXq Avtj vPbv|

**ukyv MtelYv (EDM 1205) tkum@B ciV I Abljy tbi tyt` Avcbv Ki Yq Kx?**

- UkLb cxiuzi gj- Kvb nj ubtR ubtR cto tkLv Ges ubtRi tPovq tkLv| Ab` K\_vq, G cxiuzi grafg ukqvu\_x©  
 ubR`vqfZj ubtRi mjeavgZv mgtq tkLvi KvtR ubtqvrZ nb| e`Z G Dtk`tk mvgtb ti tLb`z Af GWzKkb  
 Gi weifbeAvtmP eB, tjv iuPZ| GtZ fveMZ HK` i qvu Kti cvtvi welqe`tk KZ, tjv BDubtu fvm Kiv nqtqQ|  
 Avevi BDubtu, tjvtK KZK, tjv cvtV fvm Kiv nqtqQ| cOZiu ciV cOugk fite GKevi cotZ Avcbv 40-45 ugvbu  
 mgq jvMte etj ati tbl qv nqtqQ| cOZiu cvtvi tktl Avcub ubtRB ubtRi cvtvi AMmZ gj`vqb Kitz cvi tēb|  
 GRb` cOZiu cvtvi tktl i tqtQ cvtVēi ckqjv Ges BDubtu tktl i tqtQ Pevslgj`vqb ckqjv|
- **tkum@B covi mgq uk uk KvtRi Dci, iaZjv tZ nte?**
  - cvtVēi gj`vqfbi ckqjvi Dēi ubtR ubtR Kiab| Avcbv Dēi, tjv mWK nj uk bv, Zv cvtvi welqe`  
 chfeyY Kti ubtRB ibaY Kiab|
  - cvtVēi gj`vqfbi me, tjv cOkie Dēi mWK ntj cieZfBDubtu GvMtg hvb|
  - Avcbv Dēi, tjv mWK bv ntj cv, tjv Avevi cob| cov tkl ntj cvtVēi gj`vqfbi ckqjvi Dēi Kiab|  
 Dēi mWK ntj ci cvtV GvMtg hvb|
  - tkvb cvtV me, tjv cOkie Dēi mWK bv ntj tm cvtvi ubw` Ask Avevi cob| Gfite cOZiu BDubtu ciV, tjv  
 tkl Kiab|

eBiuZ th mg`lvbt`Rbvj-K uPy e`euZ nqtqQ tm, tjv nj :

 cvtVēi gj`vqb I Pevslgj`vqfbi ckqjv

**• cv-mnqK Kgmp**

- ♦ `z Ae GWzKkb GB eBiu Qvovl `vbxq uDUtUvi qj tmUvti Avcbv Rb` cOZ gvtm (2q I 4`A`ev 1g I 3q  
 i`mevi) `BU uDUtUvi qj Kvmi e`e`v MhY KitiQ| Gme Kvfm thvM w`tq Avcub eBiu cotZ vMtg tkvb  
 mgm`vq cotj tm veltq cOqvRbxq ciugk©I ubt`Rbv MhY Kitz cvtib| GQvovl Avcub mivmi `z Ae  
 GWzKkb-Gi tkum@ngsqKvixi m1/2 thvMthvM Kti cOqvRbxq ciugk©MhY Kitz cvtib|
- ♦ GQvovl `z Ae GWzKkb ti vVI I uVrfz cOZ mbvtn Avcbv Rb` cvv`lqvfiEK Kvmi e`e`v MhY KitiQ|  
 Avcub ibaYi Z mgtg Nti etm Gme tmktb AskMhY Kti msukó tyt` Avcbv avi Yv mgX Kitz cvtib|

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EDM 1205

# *Educational Research*

This course book on Educational Research is primarily designed to introduce the field to beginning educational researchers. The book consists six correlated thematic units. Unit I and II deal with introductory ideas on educational research. Tools and techniques which Bangladeshi researchers can quite easily prepare and handle are discussed in units III and IV. Unit V presents some statistical test methodologies. Unit VI illustrates a few uses of the most popular tool of the 21<sup>st</sup> century : computer in educational research educators, educational administrators and classroom teachers. The book presents the subject matter in self instructional text material style.

Course Coordinator : Monira Hossain.

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**Bangladesh Open University**







ḡ Ae GWKkb

ciW'cyK, ckeĪ I DEicfĪi ariv, gvbeÈb BZ'w' nelq newfbæaitbi Amyæav  
wPwýZ KiþZ mg\_°nb| cieZPwKŋv ermi mgþni Kw, tj vtZ thb G mg'ĪAmyæav  
wguĪtq tdjv mæe nq Zvi Rb' wKŋKþKI tkYxKŋ wKŋY wbfP MtelYv KiþZ nq|

mi Kvþi i wKŋv gšYvj qþKI wKŋvbwZ cųqb I ev'evqþbi newfbæw' K wbtq MtelYvi  
gva'tg tgšij K, KvþRi, MhYþhM' wmxvtšĪ tcųwtZ nq| gj'vqb Kvþŋg  
cwi Pvj bvKvix ms'v (D`nvi Y: Avgvt' i t'þki ōŋgva'wgK I D'P gva'wgK wKŋv tevWŋŋ)  
wbR'^Kvþŋtgi mej, `ŋŋ w'K wPwýZ Kiv I DbwZ Avbqþbi jþŋ' cųZubqZ  
MtelYv KiþZ cvþib| Avevi Dbqþkxj t'kmgþn `vZvms'vi A\_°mvrþh' th mg'Ī  
wKŋv cKĪ PvjYKiv nq tm mg'ĪcKĪĪ I wbeŋx KgRZŋe,` wþRiv wKsev MtelK  
wbtqvþMi gva'tg cKĪi newfbæAstki gj'vqb KvþRi Rb' MtelYv Kþib|

Avgiv ej þZ cwi, wKŋv c×wZ I Gi mvt\_ mæúwKŋ th tKvb ms'v, A½ ms'vmgæ  
wKŋv mæúwKŋ NUbvi KvþRviY wbyŋqi Rb' th aitþi MtelYv KivR Kþib Zv meB  
wKŋv MtelYvi Ašifŋ Ges mgq I hŋMvcthvMx wKŋv e'e'v cwi Pvj bvi Rb' G aitþi  
MtelYvi cųqvRbxqZv w' b w' b evotQ|

wKŋvµg, wKŋY wKlb migMŋ cųqb I e'envi, ciW'cyK Gi newfbæw' K, wKŋY-wKlb  
c×wZ, wKŋv gj'vqb BZ'w' ,iaZcy°Askmgþni Am½wZ, `ŋŋZv BZ'w' w'K  
Aej æþb wKŋv MtelYv KivR cwi Pvj bv Kivi cųqvRbxqZv AvRþKi `æZ Dbqþkxj  
wþk!Ab'xKvþŋ



### cvþVvĒi gj'vqb - 1

- mswŋŋB DEi cke
1. MtelYv mspvšĪtgštj i msÁvU e'vL'v Kiab|
  2. ōŋ1986 mvtj wWDB KZR.Avtgwi Kvi hŋ'ivtŋŋi wKvþMv wktje`'ij tq j'veþiUwi  
ḡ cųZŋv KivþK GK Aþ\_°wKŋv MtelYvi 'iiaejv mæeŋŋ GB K\_wUj Zvrch°  
e'vL'v Kiab|

**Df'ik"**

GB cW tkfI Avcwb —

- ♦ «*Q*v MteIYvi aviv eYðv KitZ cvi'eb;
- ♦ «*Q*v MteIYvi j *Q*" eYðv KitZ cvi'eb;
- ♦ cKvifft` «*Q*v MteIYvi Df'ik" wPwYZ KitZ cvi'eb Ges
- ♦ «*Q*v MteIYvi Dc#hwmZv mbr<sup>3</sup> KitZ cvi'eb|

«*Q*v MteIYvi AvšR#ZKfivte` AKZ.j *Q*"mgn mgtdqi mv#\_ μgk cwiewZ ntdqQ| tMvovi w`k eÁvbk MteIYvi c`f'cmgn «*Q*v MteIYvi f'f'f' cðqM Kiv nZ| GB mgtdqi Avf`vj btk ejv nq "Science in Education Movement"; Ebiesk Ges wesk kZtk GB aitbi MteIYv RbwcqZv jvf KtiwQj | Gicfi Rb wMDB GK bZb aviv cðZð Kitjb; "experimentalist and progressive educational thought" etj cwipZ GB aviv mnaviYZ «*Q*v, gtbv#eÁvbk I`kð kv`m#Uxq weIq wbtq ðmgm"v mgvavbgj-Kð tKšktji gva'tg MteIYv Kivtk Drmn w`Z| 1940 Gi w`k "group dynamics movement" Gi KvifY action research ev Kvthc#hwm MteIYv MteIk'f' i`wð Avklf' Kij |

wZxq wekhjxi ci Dbz wefk' "re-constructionist curriculum development activity" cðj nj Ges dj kðZtZ "action research" Avfiv Rbwcq nj | GB mgq wñi v Uven Zui wekleL'vZ "curriculum development project" Gi gva'tg «*Q*vμg cwigvRð I cwieafbi GK eÁvbk Dcvq cðZwðZ Kitjb| GB mgtdqi action research ev Kvthc#hwm MteIYv ðmgwšZ Kvthc#hwm MteIYwð ev cooperative action research bvtg cwipZ|

Avgiv hw` cKwZ. Abyvti «*Q*v MteIYvi avivK wPwYZ KitZ Piv Zte f`Le Gi gta` itqtQ gj-Z –

- «*Q*v\_#K chf'e*Q*Y Kiv gj-K aviv
- bZb avivi «*Q*v ev AMMvgx Avf`vj tbi aviv (GLvtb weÁvtbi tPtq`kðtk Ges Rxe'tbi Awf'ÁZvK cix*Q*f'Yi tPtq tewk , iæz'f`I qv nZ|)
- weÁvbwfweK MteIYvi aviv
- gvbeag#MteIYvi aviv; 1960 Gi cieZ#mgtdq GB aviv cðarb` cvq|

[AvMðx «*Q*v\_# John P Keeves m#úw`Z "Educational Research; Methodology; And Measurement : An International Handbook (gyfY Pergamon) eBWU cotZ cvf'ib|]

ᄁ Ae GwKkb

Geru Avgiu j ᄁ Kie evsj vt ᄁki ᄁkᄁᄁv eēvi DbnZKᄁr th aiᄁbi MᄁelYv Kiv  
cᄁᄁqvRb Zvi j ᄁ ᄁK cᄁKᄁZi nᄁZ cvᄁi | cᄁᄁᄁK ᄁᄁi ᄁkᄁᄁv eēvi Rbᄁ cᄁᄁqvRbᄁq  
MᄁelYvi j ᄁ ᄁbgᄁᄁc nᄁZ cvᄁi –

- Aᄁg ᄁkYx chᄁᄁ cᄁᄁᄁK ᄁᄁi ᄁkᄁᄁv eēvi DbnZKiᄁYi DcᄁhvMᄁZv  
hvPvB |
- eZᄁᄁv Av ᄁᄁvᄁᄁRK eēvq AᄁffveK ᄁᄁvR KZᄁ. Aᄁg ᄁkYx chᄁᄁ  
cᄁᄁᄁK ᄁᄁi evaᄁZvᄁj-K Kivi DcᄁhvMᄁZv | AᄁᄁZᄁbK ᄁkᄁᄁv eēvi  
MᄁYᄁhvMᄁZv ᄁbYᄁᄁ Kiv |
- cᄁᄁᄁK ᄁᄁi ᄁeÁvb ᄁkᄁᄁᄁᄁᄁᄁᄁ RᄁebᄁᄁZv ᄁbixᄁᄁY Kiv |  
BZᄁᄁ |

gvaᄁᄁK ᄁᄁi Rbᄁ cᄁᄁqvRbᄁq MᄁelYvi eᄁᄁea j ᄁᄁᄁi ᄁᄁᄁ KᄁqKᄁU DᄁvniY ᄁbgᄁᄁc  
nᄁZ cvᄁi –

- gvaᄁᄁK ᄁkᄁᄁv Kivᄁᄁv Zv hvPvB |
- ᄁkYxKᄁᄁ ᄁkᄁᄁY-ᄁkLb eēenvi ᄁvᄁZv ᄁbᄁᄁY |
- ᄁᄁᄁᄁ cᄁᄁZ Kᄁᄁᄁᄁᄁᄁᄁᄁᄁᄁ mej | ᄁᄁᄁ ᄁᄁ K ᄁbYᄁᄁ |

DᄁP ᄁkᄁᄁv ᄁᄁi GKᄁU j ᄁᄁ ᄁbgᄁᄁc nᄁZ cvᄁi –

- temi Kviᄁ ᄁekᄁeᄁᄁᄁᄁ ᄁᄁᄁᄁᄁ ᄁkᄁᄁᄁᄁᄁᄁ AvᄁRᄁZK ᄁvb hvPvB |

**MᄁelYvi cᄁᄁv j ᄁᄁ nj Gᄁb ᄁKvb bZᄁ ᄁᄁZᄁi Aᄁeᄁvi GLb | chᄁᄁ hvi ᄁLᄁR cvᄁ qv hvq  
bvB |**

ᄁkᄁᄁv MᄁelYvi KᄁqKᄁU ᄁvaviY Dᄁᄁi kᄁ ᄁbgᄁᄁc nᄁZ cvᄁi –

- ᄁKvb NUbv ev ᄁeēiY ᄁᄁᄁᄁᄁᄁᄁᄁᄁᄁᄁᄁ j vᄁ; DᄁvniY - gvaᄁᄁK chᄁᄁq  
ᄁᄁᄁᄁᄁᄁᄁᄁᄁᄁ ᄁkᄁᄁᄁᄁᄁᄁ ᄁelqᄁU Aaᄁqᄁ KᄁᄁR Mᄁᄁ Ges knᄁi ᄁkᄁᄁᄁᄁᄁᄁᄁ  
ᄁᄁᄁᄁᄁ | Aᄁᄁᄁᄁᄁᄁᄁᄁᄁ Zᄁbᄁᄁj-K MᄁelYv | GB cᄁKᄁᄁi MᄁelYᄁᄁK  
Avᄁᄁᄁ ᄁbᄁᄁᄁᄁᄁᄁᄁ ev investigative MᄁelYv ej |
- beg ᄁkYᄁᄁZ ᄁbeᄁᄁᄁK ᄁelq MᄁYKᄁᄁᄁ ᄁᄁᄁᄁ ᄁkᄁᄁᄁᄁ ᄁPᄁᄁ ᄁQᄁᄁ  
ᄁkᄁᄁᄁᄁᄁᄁ ᄁᄁᄁᄁᄁᄁᄁᄁᄁᄁ ᄁelqᄁU ᄁbᄁZ AvMᄁᄁ cᄁKᄁk Kᄁi - GB NUbᄁU  
evsj vt ᄁki kᄁᄁi ᄁeᄁᄁᄁᄁᄁᄁᄁᄁ GKᄁU cᄁᄁᄁPZ NUbv ev Pj | ᄁKvb  
MᄁelK GB ᄁbᄁᄁZ ᄁᄁᄁᄁᄁᄁᄁ hvPvB KiᄁZ AvMᄁᄁ nᄁZ cvᄁi | GB aiᄁbi  
Pj Gi KivᄁᄁvY ᄁᄁᄁᄁᄁᄁᄁ ᄁbᄁᄁZ ᄁᄁᄁᄁᄁᄁ hvPvB ᄁᄁᄁᄁᄁᄁ MᄁelYᄁᄁK ej v  
nq ᄁᄁᄁᄁᄁZ ᄁᄁᄁᄁᄁᄁ hvPvBᄁᄁ ev hypothesis testing cᄁKᄁZi MᄁelYv |

- tKvb NUbv KZevi NUtQ Ges Ab` tKvb NUbv ev KviYi mvt\_ cUgW m`uKv` Kbv Zv LjR tei Kiv - GB ai`bi Mtel YvK j`Y` ubi`cK ev diagnostic Mtel Yv ej`v nq|

GB cvtV evsj v`tki Pj gvb` uk`v e`e`vi cwi`c`v`Z uk`v Mtel Yvi j`Y` I Df`k` uk` ai`bi n`Z cvti Zv` vbtq AvtjvPbv Kiv nj | cvtVi tktI Avgiv t`tL tbB uk`v Mtel Yvi Dc`thvMZv, djvdj ev outcome uk` ai`bi n`Z cvti | uk`v Mtel K miP (Rich) Gi g`Z uk`v Mtel Yvi DcKiYMZ Ges fveMZ Dfq cKv`ii Dc`thvMZv \_vK`Z cvti |

Ab` GKRb Mtel K d`zvbr (Fulana) etj`tQb - gj-Z` B` cKv`i Mtel Yij` ä djvdj uk`v`v`t`I e`e`Z n`Z cvti | cUg cKv`i Mtel Yij` ä Avb tKvb GKW mgm`vi t`v`t` cUqM Kiv nq Ges c`i Gi mgv`v`bi gva`tg cU`B Avb cieZ`Z m`avi YxKiY Kiv nq | vZxq cKv`i cU`B Avb nj cumulative Avb Ges GB Av`bi Dci` v`v`E K`i c`t`c` v`i Kiv nq | Aek` ZZxq GKW cKv`i`f` I eZ`v`b Rbuc`y n`q DVtQ | Gi gva`tg Mtel Yij` ä djvdj mimmi we`ij q, tk`YxK`v` uk`sev uk`v`\_v` Mv` cwi`t`ki Dci` cUqM Kiv nq |

uk`v t`v`t`i m`½ m`u`v`K`Z v`elqe` v` vbtq Mtel Yv v`t`ki Db`Z t`kmg`n h`\_o Rbuc`y Zv` j`v`f` Ki`j` I evsj v`k Av`RI GB`v`t`I A`bK v`c`v`Q`q Av`Q |

GKW K\_v` g`b ivL`Z n`e, uk`v Mtel Yv I mgv`R Mtel Yv i`agv`I AZxZ I eZ`v`b e`e`vi cU`Z j`Y` v`v` t`tL f`v`el` t`Zi v` t`K` v`o` v`bex` K`i cwi`Pj`v`v` Ki`Z n`e | Kvi Y mgm`v` D`v`Z n`l`qvi c`e`B h`v` Mtel Yvi gva`tg m`v`e` mgm`v` v`v`y`Z Kiv m`v`e` nq Z`e Ziv`Z A`bK Ac`v`ZKi cwi`v`v`Z Gov`v`v` m`v`e` n`e |



## cvtVv`Ei gj`v`qb - 2

- msv`v`B D`Ei c`k`e
  1. uk`v Mtel Yvi Avv` v`e`Z`B eY`v`v` Ki`ab |
  2. evsj v`tki cU`v`gK uk`v e`e`v` m`v`t`U` Mv`xZ Mtel Yv Kiv`Ri m`v`e` j`Y` uk` v`K n`Z cvti ?
  3. Av`S`R`v`ZK`f`v`te` v`KZ uk`v Mtel Yvi avivmg`v`v` eY`v`v` Ki`ab |

**Իրդր ՄեղԿ: եսյ տ՝ Կ ԿԻԾԱՅ**

**ԺիԿ**

GB ԿՄ ԻԿԻԼ ԱրԿԻԾ —

- ♦ եսյ տ՝ Կ ԵԶՅԻԾ ԵԵԶԻ Իրդր ՄեղԿ ԱԵՎԻԾ ՍԵՅԿ ԿԻԾ ԿԻԾԵԻԾ
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00 . . . Avgit`i t`tkl Abuziej t`GKiu RvZxq uk`qv MtelYv KvDwYj `vcb KitZ nte|00

[`yLRbK ntj I mZ` th, GLtbr Avgiv GKiu RvZxq uk`qv MtelYv KvDwYj cvBub]

00MtelYvi wefbaekvLv, h\_v cixqv I gj`vqb cxuZ, uk`qvi wefbae`ti AcPq, uk`qv-A\_0xuz, QvI Amt`sl, `q` wevi s, uk`qv cwi Kibv, kvixvi K I gvurmk e`maM0t`i uk`qv, uk`qvZ Rbm`u` Rixc, cvW`ug, ubt`Rbv I civgk`vb, cvW`cyK uk`qv DcKiY BZ`w`i AM0aKvi wfiE`tZ MtelYv KvR MtelKtK DrmwnZ KitZ nte|00

00uk`qv c0Z0vbmgt`n G`Kkb wimvP`ev c0qvMg`lx MtelYvi Dci we`kl , iaZj Avt`ivc Kiv Ges MtelYvi djvdj tK cI-cuI Kv, tckvMZ mfv, Avtj vPbv BZ`w`i gva`tg h\_vh\_fv`te cPvi Kiv c0qvRb|00

cieZ`meKquI w`t`cv`UB c0q GKB aitbi m`zvwi k it`q|0

Geri Avgiv ev`e cwi w`uzi g`Lvgy` ne|

t`tki th KquI miKvix uk`qK-c0k`qY gnve`ij q Gg GW t0M0g cwi Pvj bv Kti tm`tjvtZ MtelYv`tji uk`qv`e` c0Z`tKB GKiu we`kl w`K Ae`j`tb uk`Qy MtelYvag` KvR m`ubae`Kti dissertation AvKv`ti djvdj I m`zvwi k c0Z` Ktib| RvZxq c0Bgvix uk`qv GKv`Wgx, XvKv wekte`ij tqi uk`qv MtelYv Bbiv`uDU BZ`w`i c0Z0v`bI uk`QyMtelYv KvR Kiv nq| Drmwn uk`qv-MtelKe` ubR`^D`v`MI uk`Qy MtelYv KvR cwi Pvj bv Ktib|

Dbz I Ab`vb` Dbqbkxj t`kmg`tni m`v` Avgit`i t`tk cwi Pvj Z 00uk`qv MtelYv00 Kv`Ri gj- cv`R` nj abstract m`M0nceR` gyY Kti Avgit`i MtelYv Kv`Ri tKvb `vqx ti KW`ivLv n`Q`bv, tKvb KvRiU tKvb c0kuzi Zv uba`fY Kiv n`Q`bv, cPvi Kiv n`Q`bv| tg`v`K MtelYv Kv`Ri djvdj uk`qv e`e`vi tg`v`K Dbq`b , iaZ`cY` Ae`vb ivL`tZ cv`ti w`K tZgub c0qvMg`j-K th mg`l wev`Qb`KvR n`Q`tm`tjvi m`zvwi k cieZ`Z GKB aitbi c0Z0v`bI uk`qv e`e`vi Dbq`bKt`i ev`evq`b Kivi e`e`v M0Y Kijtj t`kxq uk`qv e`e`v Dbz`zi nte; m`z`iv` Gw`tK Avgit`i mevi `w` t`I qv DvPZ|



### cv`VvE`i gj`vqb- 3

• m`sv`fjB D`E`i c0k`e

1. RvZxq uk`qv Kugkb w`t`cv`U`c0`ugK uk`qv m`0xq w`K aitbi MtelYv c0Z0vi m`zvwi k w`Qj ?
2. RvZxq uk`qv Kugkb w`t`cv`U`c0`ugK uk`qv tKvb tKvb w`K m`v`u` MtelYv Kivi c`q`gZ c0k`v` Kti?



**figKv**

ukŕŕv eZŕvb Z\_ cŕny<sup>3</sup> i hŕM cŕZ<sup>2</sup>K ivó<sup>3</sup> Ges cŕZ<sup>2</sup>K bvMwiťKi Rb<sup>2</sup> GK , iaZcY<sup>©</sup>  
figKvq AeZxY<sup>©</sup> AvbŕvnbK I DcŕvŕvnbK Dfq cKvi ukŕŕvťŕťĪ ukŕŕvne<sup>2</sup>, ukŕŕv  
gťbweÁvbx weŕfbaw<sup>2</sup> ŕKi ŕťgvbŕzi jťŕŕ<sup>2</sup> MtelYv KvR cwi Pij bv Kťi \_vťKb|

Zťe MtelYvi mgqKvj, A\_ cŕŕB I tjvKej Ges mteŕcwi DťĪťk<sup>2</sup>i cŕZ jŕŕ<sup>2</sup> tiťL  
MtelKMY weŕfbæcKvi cŕŕij Z cŕxŕzi ga<sup>2</sup> nťZ Dchŕ<sup>3</sup> cŕxŕzŕŕJ tetŕQ tbb| GB  
BDubťU ukŕŕv MtelYvi cŕŕij Z I Rbŕcŕŕ KťqKŕŕJ cŕxŕz ŕbťq Avťj vPbv \_vKťQ|

- cvV - 1 ukŕŕv MtelYvi cKviťf
- cvV - 2 Rwi c MtelYv
- cvV - 3 weŕqx Abŕv
- cvV - 4 KvťhŕcťhvMx MtelYv

**cW 1**

**uk`qv MtelYvi cKvitf`**

**Dfi`k`**

GB cW tk`l Avcb —

◆ uk`qv MtelYvi cKvitf` mbr<sup>3</sup> KitZ cviteb/

Ab`vb` th tKvb cPvj Z I Rbucq` nelqvfuEK t`q`ti MtelYvi b`vq uk`qv MtelYvtK c`vbZ `B fivM fivM Kiv m`e: tgSuj K MtelYv (fundamental) Ges e`envvi K MtelYv (applied)/

tgSuj K MtelYv c`vbZ tKvb ZExq avi Yv D`mte`bi j`q` cwi Pvj bv Kiv nq/ G ai`bi MtelYvi gva`tg ZEj D`mteb, c`hvi I we`iz. NUv`bv m`e/ tgSuj K MtelYv AZ`sl mgyZ Ges m`bqv`sz fivte tKvb bZb mZ` D` m`vU`bi j`q` cwi Pvj bv Kiv nq/

Anderson Gi g`Z – “research in education is a disciplined attempt to address questions or solve problems through the collection and analysis of primary data for the purpose of description, explanation, generalization and prediction of workable results.”

uk`qv t`q`ti tgSuj K MtelYvi tP`q e`envvi K MtelYvB tevk cPvj Z/

e`envvi K uk`qv MtelYv tm mg`l issue ev avi Yv vbtq KvR Kti thLv`b ev`eZvi cwi t`c`q`ti tKvb mgm`v t`Lv t`q ev thLv`b cPvj Z e`e`v I tKSk`tji tP`q bZb fivte ci`v`q`ti tKSkj tevk Dc`thvMx n`Z c`ti etj gZ cKvk Kiv nq/ tgSuj K MtelYvi gva`tg c`b bZb ZEj ev cwi evZ` ZEj c`qv`mi gva`tg/ dij Z ev e`envvi K MtelYv cwi Pvj bv Kiv nq/

c`KwZK ve`Avb, `Re ve`Avb, c`hiv, c`KSkj me`q`ti`B ZEj q fveavivi c`qvM, c`hiv, cwi eZ` BZ`v` i j`q` e`envvi K MtelYv mgk Rbucq`Zv j`vf KitQ/ Dbz`vek; tgSuj K Ges e`envvi K `B cKv`ii MtelYvB cwi Pvj bv Kti `v`K/ uk`S` Db`qbkxj we`tki t`kmg` gj-Z vbr`^ mgm`vfuEK e`envvi K MtelYv cwi Pvj bv Kivi c`Z S`q`ti/ c`Z`K Db`qbkxj t`k Zvi vbr`^ Av` vgv`RK Ae`vi Dci vbf` Kti uk`qv e`e`vi vevf`v` K Db`qbk`i Ri`ax vfu`E`Z vevf`v` e`envvi K uk`qv MtelYv cwi Pvj bvi Dci tRvi v`t`Q/

Avgiv uk`qv MtelYvtK Av`tiv GK ai`bi `v`KvY t`k vevf`v`v`m fivM KitZ cwi /

- HwZnvvmK (historical)
- Db`qbag` (developmental)

ḡ Ae GWKkb

- Rii C (survey)
- weI qv Abg'vb (case study)
- msfk- IvZK (correlational)
- weMZKvj vb weI q m'úwKZ (ex-postfacto)
- cirŋYgj-K (experimental) I
- Kivh'c'hwMx Mtel Yv (action research) I

cKviť` Kivi mgq GKUv K\_v Avgvť` i gtb ivLtz nte –

cxwZ, tKŠkj Gi cKviť` ev weifbzv\_vKtj I teiki fvm tŋťĀ t`Lv tMťQ Mtel K i'agvĀ GKwU cxwZ Abjvi Y bv Kti cŋqvRbtevtā GKwaK tKŠkj e'envi KiťZ Dť`vMx nb| cxwZ ev methodology wKŋv Mtel Yvi tŋťĀ `BwU tgiāi gta` Ae`vb KiťQ - tKŠkj Ges `e'ÁwbK `kŋ| m'úwZKKvťj t`Lv tMťQ wKŋv Mtel KMY wKfivte KivRwU Kiťeb Zv wbtq teiw mgq bó bv Kti eis KvR m'úbæKti Kvhr'i dj LjR tcťZ AvMŋx|

Avgiv GB cvťV wKŋv Mtel Yvi cKviť` m'úŮ wKQymvavi Y Z` tcjvg| cieZP cvw\_ťj vťZ KťqKwU cxwZ, tKŠkj wbtq Avťj vPbv\_vKte|



### cvťVvĒi gj`vqb- 1

• msŋŋB DĒi cĕæ

1. wKŋv Mtel Yvi KťqKwU , iæZcY`cKviť` Dťj Ā Ki ab|
2. tgšij K I e'envi K Mtel Yvi gta` tKvbwU wKŋv tŋťĀ AwaK Rbwcŋ?

**civ 2**

**Rnic Mtel Yv**

**Dfik`**

GB civ tk`I Avcb—

- ◆ uk`Ivg~j K KvR Rnic Mtel Yv cxwZ c`qM e`vL`v KiZ cvi`eb|

Rnic Mtel Yv cxwZi `B GKwU bglv AvRKij `wbK cwI Kv Lj`j B Avgiv t`L`Z civ| tKvb t`tki mvaviY ubePb, ivR%awZK `tj i Rbnc`Zv, tKvb bZb Dcv`v`bi e`emvqK mvdj` BZ`w` KvR weifb`Mtel Yv ms`v ubR`^Df`v`M ev gj- c`Z`ovb KZR`ub`qM c`Bi Kvi`Y civ Pij bv Kti |

Rnic K`wUj mv`\_ mvaviY RbMY RbmsL`v Rnic ev f`ig Rnic avi Yv `gUv wgvj`q t`L`Z AF`-`| Dbz` I Dbqbkj we`k; B`vbx uk`Iv`I`I Mtel Yv tek Rbnc`Zv ARB Kti`Q| tQvU bglv ub`q KvR Kivi gZ civ`w`Z`Z Rnic Mtel Yv cxwZ e`envi Kiv Pij | th tKvb Mtel Yv KvRi gZ Rnic cxwZ`Z j`I` w`i KiZ nq c`t`g|

Rnic Mtel Yvq `BwU gj- c`uqv e`envi Kiv nq| GB `BwU nt`Q wbeo mv`IvKvi ev intensive interview Ges μgewaZ civ`g`R`B ev progressive modification wZ`xq c`uqv e`envi Kij GKB mg`q c`g`wU e`envi Kiv m`e|

Rnic Mtel Yvq c`k`g`j v c`Z`K`i`Y ce`B AZ`š`\_ ia`z`c`Y`P

Avgiv Gevi t`wL Rnic Mtel Yv KvR uk`f`v`te AM`hi ntZ nq| c`t`g Rnic KvRwU gj- j`I` w`i KiZ nq, Gici j`I` j` uba`f`Y KiZ nq| j`I` t`ji tKvb c`Z`w`w`Z`k`j Ask bglv wnt`mte w`P`y`Z Kiv Avek`K Zv uba`f`Y KiZ nq| Gici c`k`g`j vi gra`tg Mtel Yvi Dcv`E m`S`M`h KiZ P`v`B`j AZ`š`\_ ia`z`; mnKv`ti c`k`g`j v c`Z` KiZ nte| c`k`g`j v c`Z` Kivi ci Gi T`wU w`P`z`Z L`j`R` tei KiZ nq| Gici c`k`g`j v hviv gv`V ch`f`q e`envi Ki`teb` t`m`B`me` gv`V Kg`f`i` ubePb KvR m`u`b`e` Kti c`q`v`R`b`x`q c`k`I`Y w`t`Z` nq| gv`V ch`f`q KvR i`i`æ`nt`j` t`k`>`i`e`>`j`Z` th Mtel K` j` Ae`-`vb` K`tib` Z`v`i` KvR nj` gv`V Kg`f`i` KvR AZ`š`\_ ia`z` m`y`f`v`te Aweiz c`u`q`v`q ch`f`e`I`Y Kiv| gv`V ch`f`qi KvR t`kl` Kti Kg`f`j w`d`ti Avmtj raw data ev c`u`g`K`f`v`te c`B Dcv`E t`k`Y`x` Kivi gra`tg dj`v`dj` tei Kivi ce`i`i`æ`n`q|

Rnic Mtel Yv KvRi Rb` c`k`g`j v `Z`wi Kivi mgq uk` ai`t`bi mZK`Z`v Aej`b KiZ nq Zv t`Le Gevi |

- D`Ei`v`Z`vi Kv`Q` th mg`-`I`k`a` Acwi`w`P`Z` g`tb` ntZ` cvti` tm`\_`t`j`v` e`envi` bv` Kiv|
- t`b`w`Z`ev`PK` k`a` ev` avi`Y`v` Dc`-`v`cb` bv` Kiv|
- GKwU c`k`k`w`AZ`w`a`K` Z`\_` enbKvix` k`t`ai` mgv`tek` bv` NUv`b`v`|



**cvW 3**

**wel qx Abŷivb**

**Dŷi k`**

GB cvW tktl Avcwb —

- ◆ wel qx Abŷivb Mtŷel Yv cxwzi cKvi t f` KitZ cvi te b;
- ◆ wel qx Abŷivb Mtŷel Yv cxwzi gj tKŷkj mbv<sup>3</sup> KitZ cvi te b;
- ◆ wel qx Abŷivb cxwz e`vL`v KitZ cvi te b Ges
- ◆ wel qx Abŷivb cxwz e`envi Kti Mtŷel Yv Kivi gZ wel q ukŷv vtŷŷŷŷ mtbr<sup>3</sup> Kitŷeb|

Avgiv GB tKvŷmp cŷg BDwbU ukŷv Mtŷel Yv mŷtU th Avtj vPbvi `iæ t` tLw Zvi gra`tg ejv Ptj ukŷv Mtŷel Yv tŷŷŷŷ ŷwU gj avivq Kvr Ptj | cŷgwU gj-Z `eAwbK Mtŷel Yvi aviv Abŷiv Y Kti GLv t b Mtŷel K GKwU ZËŷq aviv Yvi Ave<sup>o</sup>vi Ktib thwU cieZŷZ civŷŷŷŷi gra`tg cŷZwŷ nq| wŷZxq avivq gj-Z chŷŷŷŷ cxwz cŷavb` civq| Mtŷel K GLv t b GKwU gvÎ BDwbU ev GKK wb t q Mtŷel Yv KitZ B`Qv cKvk Ktib| wZwb tKvb ukŷv cŷZŷv t bi GKRB wPwŷZ ukŷv, GKwU wŷk l t k Yx, GKwU wŷk l ukŷv cŷZŷv ev GKwU wŷk l t Mwxi `eiwô` j ŷŷ` Ktib, Kvh`cxwz chŷŷŷŷ Ktib, mej -`ŷŷ w`K wPwŷZ Ktib; BZ`w | Ges cieZŷZ wZwb GB dj vdtj i Dci wŷwË Kti ukŷŷ cxwz, tKŷkj Dbæ Kivi cŷv m cvb|

GB wŷZxq aviv t K ejv nq Case Study ev wel qx Abŷivb| GB cKwzi Mtŷel Yvi gj j ŷŷ` nj NUBvi AZ`š Mfxti cŷek Kti Zx<sup>2</sup> wŷk l t Yi gra`tg GKwU wŷk l GK t Ki wŷw f b w K mŷtU GKwU e`agŷ wŷc v U`cŷZ Kiv| GB wŷc v U`ŷ Dci wŷwË Kti cieZŷZ GKB ai t bi BDwbU ev GKK mŷtU m v a v Yx Ki t Y t cŷw b mŷŷ |

**cKvi t f`**

÷vi g`vb etj t Qb, “Case study is a generic term for the investigation of an individual group or phenonenor.”

Stenhouse tKm ÷wW cxwzi gŷa` PviwU ÷vBj mbv<sup>3</sup> Kit t Qb| G, t j v nŷ`Q —

- Ethnographic—Gŷŷŷŷ GKwU gvÎ wel qe`i Mfxti Kvr nq| AskMŷYKvi x t K chŷŷŷŷ Ges gŷLvgŷ mvŷŷv K v i i gra`tg KvrwU mŷw b Kiv nq|
- Action Research - wel qx Mtŷel Yv— Gŷŷŷŷ GKwU wel q mŷtU cwi eZŷ Avbvi Dŷi t k` Kvr Kiv nq|
- Evaluative Case Study – Gŷŷŷŷ tKvb cŷw j Z ukŷv e`e`vi tKvb wŷk l w`K gj`v q t bi Dŷi t k` GB w`K mŷtU Z` Avni Y Kiv nq|

**gj tKŠkj**

welqx Abg'vb c×wZi gj tKŠkj nj chēēŋtYi gva'tg cŋqvRbxq Z'' mSMh Kiv|  
chēēŋY Avevi `B aitbi ntZ cvti- AskMhYgj-K Ges AskMhY e'wZtiK|  
AskMhYgj-K chēēŋtYi tŋtŋ chēēŋK wbtRB j ŋYxq BDibU ev `tji mvt\_ wgtk  
hvb wKŠ' AskMhY e'wZtiK tKŠkj hLb AejaB Kiv nq ZLb MtelK `jMZ  
Kivēŋvj x t\_ŋK `ŋi Ae'vb Kti m²fite chēēŋY Ktib|

**AskMhYgj-K chēēŋY c×wZiZ wKfite KivR Kiv nq?**

- cĉĀw m²fŪ GKw Lmov msĀv `Zix Kiv nq;
- GKw Kiv wK (hypothetical) e'vL'v cŪZ KiZ nq;
- MpxZ cĉĀi AvtjvtK GKw welq wbtq KivR iia Kiv nq I GB KivRi  
gva'tg hivB Kiv nq th MpxZ cĉĀw GB tŋtŋ mZ'' NUbvi mvt\_ Lvc  
Lv'Q wK bv;
- cĉĀ Lvc Lv'Q bv G iKg Ae'v t'Lv tMtj cĉĀ Ges Kiv wK e'vL'v `wji  
GKwK cymw Kiv nq hvZ Kti cixŋZ welq w e'wZ nq;
- cĉĀ MhY, welq cixŋY, cĉĀ cymw KivRw Pj tZ \_vtK hZŋY chš'GB  
`wji gta'' GKw meRvj `ŋKZ.m²úK'vcb Kiv m²e nq|

**welqx Abg'vb c×wZ AejaB MtelYv Kivi mgq MtelKtK th mg'íw ŋK tLqv  
ivLZ nq tm, tjv nt'Q –**

- AZ''š'ev'ēZvi mvt\_ cŋwK aviYv t\_ŋK KivRi bKkv cŪZ Kiv;
- MtelK wntmte wK aitbi GKvWwK ŋwZ nevi m²ebv AvtQ Zv chēēŋY  
Kiv;
- tKvb aitbi eRŋthw'' wPš'í fievb djvdtji mvt\_ m²ú,³ ntZ cvti tm  
m²fŪ m²PZb \_vKv;
- MtelYv KivRw Rb'' Dchŋ' vb LjR tei Kiv;
- thw'Zi Z'' cŋvbKivxK LjR tei Kiv;
- chēēŋtYi mvgwRK cwitek m²fŪ m²PZb \_vKv;
- Z'', cŋvY BZ''w' wKfite tiKW'Kiv nte tm m²fŪ m²úó cwíKíbv `Zwi  
Kiv;
- Z'' tkYxexKiY m²fŪ 'úó wvš'íMhY Kiv;
- aviYv ntZ Kiv'm²úv`b chš'í tKvb ga'eZ' chŋq KZUKzmgq j wMte Zv  
wbaŋY Kiv;
- wícvŋ tKvb cwíw'wZtZ tKvb aitbi `kŋKi mvgtb cKvk Kiv nte Zv  
wbaŋY Kiv|

**welqx Abg'vbi gva'tg GKRB MtelK GKw gj-ZĒ; 'vcb KiZ cvtib|**

**welqx Abg'ivb cxiZtZ KvR Kivi Rb` wZb cKvi bgb'iqb Kiv nq-**

quota sampling, snowball sampling Ges search for exception.

tKivUv bgb'iqtb MtelK cxiZU wfbam`u0vq nZ KtqKRbtK wbePZ Ktib| Ztvi ej  
bgb'iqtb GKUw wekl NUbv tiKW`Kti mugstq Abj/c Avtiv NUbv tLVRv nq| wekl  
NUbvi AbjUvb bgb'iqtb KivRi cA`-tK fj` cgyYZ Kiv nq ev GKUw cwienZ  
ifc c0vb Kiv nq|

welqx Abg'ivbi gva`tg tKiv wekl tkYxi tKiv Aeva` wKv`\_A AvPiY chfe`Y  
Kiv, wekl wKv`Ki tkYK` chfe`Y Kiv, tKiv wcuQtq cov wekl wKv`\_A tKiv  
wekl welq Abg'ivbi AvMh` wbyq Kiv BZ`w` KvR Kiv mae`|

welqx Abg'ivb cxiZtZ c0B MtelYv djvdtj i`KwZ. tctZ ntj MtelKtK KZ`\_tjv  
w`tK mvearbZv Aej`b KiZ nte, thgb -

- Z` msMh` tKSkj e`vL`v KiZ nte|
- msMpxZ Z` wivtU`c0k0 KiZ nte Ges th tKiv mgq cYtwek- IY  
thvM` Ae`vq msi`Y KiZ nte|
- FYvZK D`vniYmgfni D`jL`\_vKte wivtU`
- gvV chfqi KvRi weklY wivtU`AvKv`i wj wceX KiZ nte|
- Abg'ivb Ges cgyYgj-K KvRi ga`Kvi m`uK`wbyq KiZ nte|
- c0`ugK Ges gva`ugK Zt`\_i gta` cv`R` wbyq KiZ nte mif`\_ mif`\_ eY0v I  
e`vL`vi gta`I cv`R` Ztj` aitZ nte|
- cKZ.KvRi weiy Wtqi xi gva`tg msi`Y KiZ nte|
- Zt`\_i DrKI0v thb wqsy Kiv mae` nq tmw`tK tLqj i`vL`Z nte|



**cvfVei gj`iqb- 3**

- msMfjB DEi ckae
  1. welqx Abg'ivb cxiZi cKvif` wj Lj|
  2. AskMh`Ygj-K chfe`Y cxiZtZ GKRB wKv` MtelK wK c0`uqvq KvR  
Ktib?
  3. welqx Abg'ivb cxiZ Aej`b Kti MtelYv KvR Kivi mgq GKRB MtelK  
tKiv w`K`\_tjvi c0Z`j` i`vL`teb?
  4. welqx Abg'ivb gva`tg MtelYv KvR cwipj`bv Kivi mgq MtelK wK aitbi  
mvearbZv Aej`b Kiteb?



### **Kvthc̣thvMx Mtel Yv**

#### **Dḡik**

GB cW tḳl Avc̣b —

- ◆ Kvthc̣thvMx Mtel Yvi msÁv c̣vb KiḡZ cviḡeb;
- ◆ Kvthc̣thvMx Mtel Yvi Dḡik eYḅv KiḡZ cviḡeb;
- ◆ Kvthc̣thvMx Mtel Yvi thšw<sup>3</sup>KZv e<sup>v</sup>L<sup>v</sup> KiḡZ cviḡeb Ges
- ◆ Kvthc̣thvMx Mtel Yvi <sup>ˆ</sup>enkó mbr<sup>3</sup> KiḡZ cviḡeb|

Kvthc̣thvMx Mtel Yv ev action research c̣Pij Z Mtel Yv c̣xwZ, ḡj vi ḡta eZḡvḡb AZ<sup>ˆ</sup>šl Rbuc̣ḡ| GB aiḡYi Mtel Yv tḳb ubw<sup>ˆ</sup>ómgq mḡvi ḡta D<sup>m</sup>Z tḳvb GKwU mḡm<sup>v</sup>i KṿhRi mḡvavb LḡR tei Kivi Rb<sup>ˆ</sup> GK AvavbK c̣ḡuqv| Kvthc̣thvMx Mtel Yv c̣w<sup>v</sup>w<sup>v</sup>Z ẉbFḡkxj, A<sup>ḡ</sup> tḳvb GKwU ẉtkl c̣w<sup>v</sup>w<sup>v</sup>Z ev aviYi ḡta tḳvb GKwU mḡm<sup>v</sup>v mbr<sup>3</sup> Kḡi GKB c̣w<sup>v</sup>w<sup>v</sup>Zi ḡta mḡm<sup>v</sup>U<sup>i</sup> mḡvavb LḡR tei Kiv nq GLvḡb| G aiḡbi Mtel Yv mnḡhM<sup>Z</sup>vi ḡvaḡḡ m<sup>v</sup>ubæKiv nq, GK<sup>j</sup> MtelK Ges ẉtklÁ ev practitioner GKm<sup>v</sup>ḡ GKwU Kvthc̣thvMx Mtel Yvq AskM̄Y Kḡib Ges Zviv ẉbḡRivB GwU c̣w<sup>v</sup>Pj bvi fvi M̄Y Kḡib|

#### **Kvthc̣thvMx Mtel Yvi msÁv Avḡiv ẉḡḡc̣ ẉḡZ c̣w<sup>v</sup> –**

ẉeL<sup>v</sup>Z ẉkḡẉe<sup>ˆ</sup> Kemmis eḡj ḡQb, “action research aims to help practitioners investigate the connections between their own theories of education and their own day-to-day educational practices, A<sup>ḡ</sup> tckvq ẉbḡq<sup>v</sup>RZ ẉkḡK hLb ẉkḡv m<sup>v</sup>Üxq Zḡḡi m<sup>v</sup>ḡ<sup>ˆ</sup> ẉbR<sup>ˆ</sup>tckv<sup>v</sup>f<sup>v</sup>ĒK KṿRi m<sup>v</sup>úK<sup>ˆ</sup>LḡR tei KiḡZ AvM̄x nb ZLb ẉZẉb action research ev Kvthc̣thvMx Mtel Yvq ẉbḡq<sup>v</sup>RZ nb|

Kemmis Avḡiv eḡj ḡQb – It aims to integrate the research act into the educational setting so that research can play a direct and immediate role in the improvement of practice. [Kvthc̣thvMx Mtel Yvi ḡvaḡḡ Mtel YvḡK ẉkḡv DcKiḡYi ḡta GKx<sup>F</sup>Z Kiv m<sup>v</sup>ḡ Ges Gi dḡj c̣ḡqv<sup>ˆ</sup>Mi tḡḡḡK ZvrḡẉYKf<sup>v</sup>ḡe Dbḡ Kiv m<sup>v</sup>ḡ nq|]

#### **Kemmis Ges Mc Toggart Gi ḡḡZ Kvthc̣thvMx Mtel Yvi msÁv nḡe ẉḡḡc̣ –**

action research is a form of collective self-reflective enquiry undertaken by participants in social situations in order to improve the productivity, rationality and justice of their own social or educational practices.

Gḡi ḡḡZ Kvthc̣thvMx Mtel Yv Aek<sup>ˆ</sup>B ḡj MZ ev mnvqZvi ḡvaḡḡ KiḡZ nḡe|

ev`éZvi cwi`c`q`f`z hLb tKvb Pj gvb Kv`Ri Dci q`z`gv`vi m`x`v`š`l`M`h`Y Kiv nq Ges cieZ`f`Z GB cwi`ew`Z`Z Kv`Ri Dci m`z` `w`o` ube`U` ivLv nq ZLb Avgiv ej`f`Z cwi`i` tckvq` w`b`q`v`R`Z e`w`o` w`b`f`Ri tckvi c`q`v`f`Mi t`q`f`i Db`q`f`bi Rb` action research Ki`f`Qb A\_`f` action research ev Kv`f`h`c`f`h`v`M`x M`f`el`Yv situational ev cwi`c`c`q`f`Z w`b`f`P`| tKvb w`e`f`kl cwi`w`-`w`Z`f`Z hLb tKvb w`b`w`-`o` m`g`m`v` t`L`v` t`q` ZLb t`m`B m`g`m`v`i `i`a`z`j`l` M`f`xi`Z`v` w`P`w`y`Z` K`f`i` D`m`z` cwi`w`-`w`Z`f`Z Gi m`g`v`a`v`b` L`t`R` t`e`i` Kivi` t`P`o`v` Kiv nq GB c`x`w`Z`f`Z| m`v`a`v`i`Y`Z` GB a`i`f`bi M`f`el`Yv m`n`f`h`v`M`Z`v`i` w`f`i`E`f`Z` Kiv nq Ges G`u`U` participatory`ev` Ask`M`h`Y`g`j`-`K`| A\_`f` m`-`m`e`x` w`b`f`Ri`v`B` m`a`u`Y`q`K`sev` A`v`i`k`K`f`i`f`e` GB M`f`el`Yv` Kv`R` m`a`u`y` nb|

**Kv`f`h`c`f`h`v`M`x M`f`el`Yv` `e`i`k`o`-`m`g`n`-`w`b`g`i`f`c` -**

**“eikó”**

- GB a`i`f`Yi` M`f`el`Yv` cwi`c`c`q`f`Z` w`b`f`P`;
- m`n`f`h`v`M`Z`v`g`j`-`K` c`-`f`q`f`i`c`i` g`v`a`f`g` Gi` Kv`R` P`f`j`;
- Ask`M`h`Y` ev` practitioner` Gi` g`v`a`f`g` M`f`el`K`e`x` w`b`f`Ri`v`B` G`u`U` m`a`u`b`e` K`f`i`b`;
- `^`g`j`-`v`q`f`bi` g`v`a`f`g` ev`-`e` cwi`w`-`w`Z`f`Z` m`g`m`v`i` m`g`v`a`v`b` μ`g`k` P`w`j`f`q` h`v`l` q`v` n`q`|
- on-the-spot` ev` `^`v`f`b` t`-`f`K`B` M`f`el`Yv` Kiv` h`v`q`| A\_`f` `l`i`w`f`i`E`K` Ask`m`g`n`-`A`Z`-`š`l` `i`a`z`j`m`n`K`v`f`i` monitor` Kiv` m`a`e` n`q` h`v`i` d`f`j` w`d`W`e`v`K` Z`i`v`q`w`Y`K`f`i`f`e` P`j` g`v`b` c`x`w`Z`i` m`v`f`-`R`f`o` t`-`l` q`v` m`a`e` n`q`|
- Ab`v`b` c`x`w`Z`i` m`v`f`-` GB` c`x`w`Z`i` g`j`-`c`v`-`R`-` n`j` t`K`v`b` G`K`u`U` w`e`f`kl` P`j` K`f`K` K`L`f`b`v`B` m`g`w`o` t`-`f`K` c`-`K` K`f`i` c`h`e`q`f`Y` Kiv` n`q`v`|
- t`h`f`n`Z`z`G`B` M`f`el`Yv` w`b`w`-`o` `v`f`b` e`f`m` cwi`P`v`j`b`v` Kiv` nq` Z`i`B` `j`w`f`i`E`K` w`g`-`w`-`f`v` c`v`l` q`v` m`a`e`|
- GB` c`x`w`Z`i` b`g`b`x`q`Z`v` l` m`n`f`h`v`R`b` q`f`g`Z`v` i`f`q`f`Q`|

ब्रह्म Gi` g`f`Z` Kv`f`h`c`f`h`v`M`x M`f`el`Yv` `B`u`U` `l`i` A`v`f`Q` diagnostic` ev` w`b`Y`q` `l`i` Ges` therapeutic` ev` A`v`f`i`v`M`-`l`i`| w`K`š` w`k`q`f`v` M`f`el`Yv`i` t`q`f`i`f`i` t`-`b`n`v`D`m` GB` c`x`w`Z`i` G`K` w`f`b`z`i` A`e`-`v`i` c`i`Z` `i`a`z`j`f`-`b`| Z`u`i` g`f`Z` w`k`q`f`v`i` m`f`z` m`a`u`m`K`z` m`g`m`v` w`b`f`q` Kv`f`h`c`f`h`v`M`x` c`x`w`Z`f`Z` Kv`R` K`f`i` t`h` d`j` c`v`l` q`v` h`v`f`e` Z`v`i` i`a`g`v`i` t`h` c`q`v`M`f`h`v`M`Z`v` `v`K`f`Z` n`f`e` Z`v` b`q` e`i`s` w`k`q`f`v` m`a`u`x`q` Z`E`j` w`n`f`m`f`e` G`u`U` R`b`w`c`q`Z`v` j`v`f` K`i`f`e` G`i`f`c` m`a`e`b`v` `v`K`f`Z` n`f`e` Ges` h`v`i` t`k`Y`x` w`k`q`f`f`Y`i` m`v`f`-` m`a`u`m`K`z` n`q` Z`f`e` Ab`-` w`k`q`f`K`i`v`l` Gi` e`-`n`v`i` Ki`f`Z` c`v`i`f`e`b` G`i`f`c` A`v`k`f`m` t`c`f`Z` n`f`e`|

w`k`q`f`v`f`q`f`i` Kv`f`h`c`f`h`v`M`x M`f`el`Yv` c`x`w`Z` c`q`v`f`Mi` h`f`-`o` m`f`h`v`M` i`f`q`f`Q`| t`h` t`K`v`b` w`e`l`q` w`k`q`f`K` t`K`v`b` G`K` b`Z`b` t`K`š`k`j` A`e`j`-`a`d` K`f`i` b`e`g` t`k`Y`f`Z` M`w`y`f`Z`i` o`o`t`m`f`U`i` a`v`i`Y`v`o`o` c`o`v`f`e`b` -` w`Z`w`b` Kv`f`h`c`f`h`v`M`x M`f`el`Yv` c`x`w`Z` A`e`j`-`a`d` Ki`f`Z` c`v`f`i`b`|

**Kvthrc:thvMx MtelYv I e'envi K MtelYvi gta' wj I cv\_R' tKv\_wq?**

- DfqB ሎÁmbK MtelYvi aviv AbmiY Kti |
- e'envi K MtelYv ZÉmgñ cixግlv Kti Ges m'úK©'vcb Kti etj Gi kZግñ tek Kwb cKwZi mzi'is e'envi K MtelYvi tግጥÁ Awak msL'K tKm ev tግጥj K Dcv`vb chግግY Kiv nq|
- Kvthrc:thvMx MtelYv ሎÁmbK MtelYv cxwZi aviv AbmiY Kiti | AZ`sí bgbxq gvጥvq Zv e'envi Kti | KviY Gi gj- Df'k' nj GKwU wtkl cwi`wZtZ GKwU gvጥ wtkl mgm'vi mgvaib LjR tei Kiv| e'envi K MtelYvq th mg`kZ'ጥgb Pjv nq Zvi Awakvsk wkwj Kti cግqM Kiv nq Kvthrc:thvMx MtelYvi tግጥÁ |

**Df'k'**

we`'vj q Ges tkYxKግ m'úKZ Kvthrc:thvMx MtelYv maviYZ wta<sup>3</sup> Df'k' mgñai wfiÉtZ cwiPwj Z nq –

- tKvb wtkl cwi`wZtZ mbr<sup>3</sup>KZ.tKvb mgm'vi mgvaib LjR tei Kiv;
- PvkxiZ wግKt' i tKvb bZb `ግZv I cxwZ m'úÜ aviYv ARፀ Kivi tግጥÁ;
- tKvb Pj gvb e'e`vq tKvb AvaybK ev bZb tKvb Awak msthvRb Kivi cግqvRbxqZv t`Lv w` tj ;
- tkYxKግ wግK Ges GKvWwግK Mtel#Ki gta' m'úK©Dbጥbi cግqvRb t`Lv w` tj GB cxwZtZ MtelYv Kiv hvq;
- tkYxKግ m'úxq tKvb mgm'v mgvaibgj-K aviYv ev ZÉ; weKv#ki cግqvRbxqZv t`Lv w` tj |

**tK ev Kiv MtelYv Kiጥeb?**

Kvthrc:thvMx MtelYv GKKfiጥe, `jMZ fiጥe Ges cvi`úwi K mnthvMZv ev collaboration Gi wfiÉtZ Kiv m'ፀ|

**Kvthrc:thvMx MtelYv cwbZ chግግY Ges AvPiY ev `fiemZ DcvÉ e'envi Kti |**

tKvb GKwU MtelYv KivR hLb Kvthrc:thvMx cxwZtZ cwiPwj bv Kiv nq ZLb Z` msMፀ Kiv Ges mvgwMk wfiÉtZ Zv e'envi Kiv nq, Z` aviY Kiv nq; gj`vqb Kiv nq| wbw`ፀ mgqmግvi gta' Gi AMwZ m'úÜ Avtj vPbv Kiv nq cግqvRbጥta AMwZ ZjwšZ Kivi Rb` bZb aiጥbi tKškj msthvRb Kiv nq|

**mግie×Zv**

Kvthrc:thvMx MtelYvi bgbxq `ewktó'i Rb` AጥK MtelK G#K tKvb tግጥj K MtelYv cxwZ etj `Kvi KitZ Pvb bv|

**c0qvMi tŷŷmgn**

wbŷge<sup>3</sup> tŷŷmgn KvtŷcŷhvMx MŷelYv c×wZi gvaŷg wkŷŷv m=0iq weŷtqi MŷelYv Kiv nq –

- wkŷŷY c×wZ – A\_ŷ c<sup>2</sup>vMZ c×wZi cwieŷZŷhv tKvb wkŷŷK tKvb GK Awfbe c×wZ e`envi KiŷZ Pvb|
- wkLb tKŷkj – thgb GKK weŷqvŷŷEK wkLb Ges mvgwMŷK cvV`mŷP Aeŷ ŷfb wkLb Gi gŷa` tKvbwU Dŷg Zv tei Kiv|
- gj`vqb tKŷkj – tKvb wkŷŷK hv` Zvi MvŷvK gj`vqb Dbz KiŷZ Pvb Zŷe ZvŷK GB MŷelYv c×wZ wbfŷ nŷZ nŷe|

**MŷelYv cwiPvj bvi c`ŷŷcmgn wbgŷc –**

mgm`v mbr<sup>3</sup>KiY, MŷelYv Kivi KvtR AvMŷx e`w<sup>3</sup> ev `jmgŷni ga`Kvi c0wGK Avŷj vPbv, ZZiq chŷq c0qvRbŷvŷa c0vkZ GKB aiŷbi MŷelYv KivR chŷj vPbv Kiv, PZZ`chŷq c0vkZ KvtRi Avŷj vŷK c0qvRbŷvŷa cŷeŷ<sup>3</sup> mgm`v bZb AvwŷtK Zŷj aiv Gi cŷi chŷq MŷelYv tKŷkj wbaŷY Kiv nq Gi gŷa` iŷtŷQ bgŷvqb I MŷelYv cwiPvj bv e`e`v A\_ŷUb, m`mŷ`i c0kŷŷY c0vb, Gi cieZŷchŷq gj`vqb Kjv tKŷkj w`i Kiv nq| mŷg chŷq c0R± Kvhŷi Kiv nq|

meŷkŷl c0B Z\_` ev DcvE weŷkŷY Kiv nq, wmxvŷŷMŷY Kiv nq, Ges GKB mŷ\_ MŷelYv c0R±wU mŷWK gj`vqb Kiv nq| GB mgŷq t`Lv nq wk aiŷbi fŷ avŷŷ nŷqvŷj, wk aiŷbi mgm`vi D`ŷe nŷqvŷj |

KvtŷcŷhvMx MŷelYv c×wZ BDŷivc I Avŷgwi Kvi wkŷŷvqZbmgŷn hŷ\_ó RbŷcŷZv ARŷ KŷiŷQ| eisj v`k weŷfbŷe wkŷŷv Kwgkb wiŷcŷU we`ijŷqi wkŷŷKŷi KvtŷcŷhvMx MŷelYv Kivi mgwŷk \_vKŷj I GB aviYv ev`ŷŷŷŷŷ tgvŷUB RbŷcŷZv jvŷ Kŷi bvB|



**cŷVvEi gj`vqb - 4**

- mŷŷŷB DŷEi c0æ
  1. KvtŷcŷhvMx MŷelYvi gŷa` wk aiŷbi `enkó` \_vKv DŷPZ?
  2. wkŷŷv e`e`vi mŷ½ m=0wKŷ tKvb tŷŷŷŷ wk aiŷbi KvtŷcŷhvMx MŷelYv nŷZ cŷi?
  3. we`ij q Ges tkYkŷŷ m=0wKŷ KvtŷcŷhvMx MŷelYvi Dŷŷk` wk wk nŷZ cŷi?

## fiğKv

ıKŦıv e"vi ueıfbaı tKi mgn"v mgraııbi j tŦı" ıKŦıv MtelYvi hvııv i iæ AvR t tK cıq GKk eQi AvıM| Aek" AvRI AıtıKB mıt"n Kıtıb th 00ıKŦıv MtelYv00 mız"Kvi Aıt"eÁııbK MtelYvi chıqgŦ nıtZ cııı ıKbv| eÁııbK MtelYvi gZ`ıgx, RiıUj DcKiY I hŞıvıZi c0ıvıRb ıKŦıv MtelYv tŦııT nq bv, Zeyc0Z"K ıKŦıv MtelKıtK c0ıvıRbıq ıKQyDcKiY ıbR"ıPııı"v Abıııqı c0Z Kıtı e"enıv KıtıZ nq|

eZııb BDııııU ıKŦıv MtelYvi KıtıKııU e"enıv tıııM" DcKiY ııbtq Avıtı vPbv vıKıtQ|

cW - 1 ıKŦıv MtelYv : avcmgn

cW - 2 ıKŦıv MtelYvi tKŞkj

cW - 3 Z" msM0 tKŞkj I DcKiY : c0ıvıM I mıgıeıZıv

cW - 4 mŦııvıKvi tKŞkj

cW - 5 cıqıııv : c0Z c0ıııııı I e"enıv

**cW 1**

**ukŷv MtelYv : avcmgr**

**Dfi`k`**

GB cW tk`l Avcb —

- ◆ ukŷv MtelYvi avcmgr mbr<sup>3</sup> Ki`Z cvi`teb;
- ◆ ukŷv MtelYvi Askmg`ni , ia`zj`e`vL`v Ki`Z cvi`teb Ges
- ◆ ukŷv it`ŷi mi`\_ m`u`K`Z MtelYvi m`e` mgm`vgj`-K ev`e D`vniY Dc`vcb Ki`Z cvi`teb|

cŭg BDib`U Avgiv t`LwQ th, Avab`K RMtZ ukŷvi wefbaew`K msp`v`š`i MtelYv  
µgk AZ`š`i , ia`zj`e`vL`v `Lj Kt`i`Q| GKB BDib`U wefbae`cvi`V Avgiv ukŷv  
MtelYvi j`ŷ, Dfi`k` I c`kvi`f` ibtq| Avtj`vPbv tctq`wQ|

eZ`g`v BDib`U cŭg cvi`V Avgiv ukŷv MtelYvi wefbae`Ask ibtq msv`ŷ`B Avtj`vPbv  
Kie|

Ab`vb` th tKivb c`kwi`zi MtelYvi b`vq ukŷv MtelYvi c`x`Z , tj`vi g`a` ibtge<sup>3</sup>  
Ask , tj`v mshŷ `v`K:

- mgm`v`v Pny`ZKiY
- mgm`vi ms`Av cŭvb
- Mtel`Ki cee`Z`P Awf`AZvi wfi`E`Z mgm`v m`u`K`Z GKwU Kivh`Ri  
(Abvg`Z) w`x`v`š`i Mh`Y
- MtelYvi Rb` cŭqv`Rbxq tools ev` n`w`Z`qvi ev` Dc`KiY mbr<sup>3</sup> KiY
- Dc`KiY tools ev` n`w`Z`qvi cŭ`Z`KiY I Gi miv`v`th` cŭqv`Rbxq I  
wbf`P`thv`M` Z`\_` msMh` Kiv
- msM`px`Z Z`\_` web`im I tk`Y`x`e`x`KiY
- Abvg`Z w`x`v`š`i wfi`E`Z Z`\_` we`k`d`Y`KiY|

Gic`ti c`t`ŷ`c , tj`v AZ`š`i , ia`zj`e`vL`v

Z`\_` we`k`d`Y` Kiv tkl ntq tMj Avbg`v`wb`K th w`x`v`š`i Mh`Y Kiv ntq`w`Qj tmw`U  
th`š`v`K`Zv hiv`v`B Ki`Z nte| hiv`v`B cte`P ci Gi Mh`Y`thv`M`Zv t`L`v w`tj w`x`v`š`i  
Mpx`Z nte| Ab`\_`vq Gw`U`K Gt`Kev`ti eR`B Ki`Z nte uk`sev t`L`Z nte mst`kvab Kiv  
m`e` uk`bv| w`x`v`š`i mst`kvab Kiv m`e` ntj bZ`b`f`v`te w`x`v`š`i wj L`Z nte Ges Zvi  
wfi`E`Z Avevi Z`\_` msMh` ch`ŷ`q w`d`ti th`Z nte| A`\_`ŷ bZ`b`f`v`te cir`ŷ`Yw` i`i`e`Ki`Z  
nte|

ġ Ae GWKKb

MtelYv KtR th cġgjjv e'euZ nq Zv mvariYZ mbtgr<sup>3</sup> wZbuU Abgytbi Dci wfE  
Kti cġZ Kiv nq –

- DEi `vZv cotZ cvtib Ges cġkġ A\_ ©Abgyetb mġg|
- cġkġ DEi cġvtbi gZ Z\_ DEi `vZvi wBKU itqtQ|
- DEi `vZv m<sup>u</sup>Y<sup>m</sup>ZZvi mvt\_ DEi cġvtb m<sup>s</sup>Z|

Avgiv hw` Dctii Avtj vPbv t\_ġK , iazcY<sup>o</sup>AskUKZZtj atZ Pvb Zvntj eje  
wġġv MtelYv KvR cui Pvj bv Kivi Rb` th mg`c`ġġc mbtZ nq Zv nj –

- mgm`v wPwYz Kiv|

[D`vniY: 1996 mvtj beg-`kg tkYxi weÁvb wġġv\_ġ` i Rb` th c`v\_ ©weÁvb eBwU  
i wPZ ntqtQ Zv tkYxKġġ covtZ MġvĀtj i weÁvb wġġKġ` i Amyeav nt`Q|]

- GB mgm`wUġK msÁwqZ KiġZ nte MtelKġK|

[D`vniY: MġvĀtj i we`vj tqi weÁvb wġġKMY beg-`kg tkYxi c`v\_ ©weÁvb eBwU  
tkYxKġġ covtZ Amyeavteva KiġQb|]

MtelġKi Gictii c`ġġc nj wZwb GKwU KvhRi w<sup>x</sup>všMġY Kiġeb|

[D`vniY: MġvĀtj i weÁvb wġġKġ` i c`v\_ ©weÁvb m<sup>z</sup>K wWwMŌbv \_vKvi KviġY Zviv  
evBwU covtZ cviġQb bv|]

GB w<sup>x</sup>všwU MtelKġK Dch<sup>y</sup> cirġġYi gva'tg cġvY KiġZ nte| m<sup>z</sup>ivs ZvtK  
cġqRbxq I Dch<sup>y</sup> tools ev n<sup>w</sup>Zqvi mbr<sup>3</sup> KiġZ nte|

Dctii mgm`wU AbgyZ w<sup>x</sup>vš m<sup>u</sup>ġ tKvb w`i e`vL`v tġZ ntj MtelK wntmte  
Avgiv miwmi mġġvKvi, cġgjjv, BZ`w` wefbaaitbi n<sup>w</sup>Zqvi e`envi KiġZ cwi |  
cieZġZ Z\_`ek; ntZ representative sample ev cġZwbazġkj bġbvi gva'tg Z\_`  
msMġ Kie| hw` cġgjjv e`envi Kwi Zte cġgjjvi gva'tg th Z\_` cvlqv hvte  
tm\_ġjvtK ce`wba<sup>w</sup>i Z wKQywbqg Abgyt<sup>i</sup> tkYx<sup>x</sup>KiY KiġZ nte| Gici Z\_`  
weġk- IY Kti th msuġġB ifc cvlqv hvte Zvi m<sup>v</sup>vth` AbgyZ w<sup>x</sup>všwU Avgt` i hvPvB  
Kti t`LġZ nte|

Dctiv<sup>3</sup> mgm`wU tġġġ t`LġZ nte djvdj hv tcjvg Zv wK mg\_ġ Kti th MġvY  
weÁvb wġġKġ` i c`v\_ ©weÁvb eBwU covtZ m<sup>w</sup>Z`Kvi At\_ ©Amyeav nt`Q?

hw` `Qfite tKvb w<sup>x</sup>vš tġġv<sup>3</sup> m<sup>e</sup> bv nq Zvntj Avgt` i w<sup>x</sup>vš cwi gvRġ  
KiġZ nte ev crġvZ nte Ges cwi gwR<sup>2</sup> hypothesis Gi Avtj vtK bZb Kti Avevi  
Z\_` msMġ I weġkġY KiġZ nte|

Aek` c`qvRbterta Mtel K tKvb c`tqj c`xNiqZ Ki tZ cvtib ev tKvb GKUJ avctK  
Gwotq P t j b | Dbz wefk; Mtel K KLtbv KLtbv wbr`^MwZtZ wbr`^cxwZtZI Mtel Yv  
Kti \_vtKb|

GB cvtVi gva`tg wkqv Mtel Yv cxwZi m`te` avc` t j vi mv t\_ cwi wPZ nj vg|



### **cvtVvEi gj`vqb- 1**

- **mswqjB DEi ckae**

1. wkqv Mtel Yv cwi Pij bv Kivi wefbræavc wK?
2. wkqv t`q t`i Avcbri wbr`^tckvfiEK MÜxi ga` n tZ GKUJ mgm`v wPwYZ Ki ab  
thwJ m`tÜ Mtel Yv cwi Pwv Z n l qv DvPZ etj Avcbri avi Yv|





Rvi c Mtel Yiq gj- MtelK `j gvVKgŷ i mrvh`Kvix wntmte wbtq \_v`Kb| AwKvsk mgq Ktj R, wekŷe`ij tq QvT-QvTxe, ōŌAemi mgta KvR Kti A\_©DcvRŷ Kivi Dtl`tk` G mg`l KvR Ktib| G mg`l gvV Kgŷ i eZŷvb mgta weifbweAwfA-wfiwI DcKiY e`envi Kti `f Zg mgtaqi gta` Dchŷ `ŷZv ARŷb mrvqZv Kiv nq|

**D`niY**

gtb Kiab, GK`j MtelK beg-`kg tkYxi bZb c`v\_©weÁvb l imvqb weÁvb civ`  
`ŷvUi weIqe`i MŷYthvM`Zv gvcZ Z Prt`Qb|

Gt`i j ŷŷ`j hrv` ucZvqvZv ev AwffveK nq Zte Mtel Yv KvR cvi Pjv bv Kivi mgq Gt`i cjfbv civ`cyK Ges bZb civ`cyK Dfqb DcKiY wntmte e`envi Kitz nte| G, tjv`K Avgiv gj- DcKiY bv etj “visual aids” ej e|

Kvthc`thvMx Mtl Yv cxwZtZ Mtel`Ki cKwZi Dci wbfP Kti DcKityi cKvif` | GB aifbi cheŷŷYthvM` DcvE wZb aifbi nq –

- weewZgj-K (narrative)
- MvVwbK Pj vPj gj-K (structured protocol)
- tivUs

gvV chŷq weewZgj-K ev narrative DcvE msMŷ Kitz ntj MtelK wbtRB tkYxKtŷŷi ucQtib tetÁ etj cheŷŷY Kitz civtib| G mgq wZvb Wvqix, tviU, Rvbŷŷ, AwWI ev wfiwI avi YthvM` DcKiY mt½ wbtZ civtib|

welqx Abyvb cxwZtZ cheŷŷYi gva`tg, cKŷvjv, mvŷŷvrv Kivi Ges msivŷZ Z\_`  
tikw`e`envi Kti KvR Kiv nq etj G, tjv`K DcKiY wntmte AvL`wqZ Kiv nq|

wkŷŷv MtelYvi Z\_` msMŷni th mg`l tKŷkj ,tjv Rbwcŷ Zvi gta` gŷLvgŷ  
mvŷŷvrv Kivi, WvKvthvM` cKŷvjv tcvY, gvVKgŷ i mrvqZv, BZ`w` Dtl`L Kiv Pj |

Avgiv t`Ltz tcjvg wkŷŷv MtelYvq th cxwZB AbyviY Kiv tnvK bv tkb cŷ`ŷŷ  
cheŷŷY, wj wLZ cKŷvjv, tgŷwLk cŷkwe`i ce,© AwWI -wfiwI aviY Kiv hŷc`wZ,  
msivŷZ ev cKwKZ Z\_` DcKiY wntmte e`eüZ nq|



**civVvEi gj`vqb - 2**

- msivŷB DEi cKœ
  1. Z\_` msMŷ tKŷkj wntmte cKŷvjv gva`tg mvŷŷvrv Kivi – eYŷv Kiab|
  2. cKŷvjv gva`tg th mvŷŷvrv Kivi MŷY Kiv nq ZvtZ cKœvZvi wK wK `enkó`  
\_vKv cŷqvRb?
  3. cheŷŷYthvM` DcvE KZ cKvfi i nq?
  4. weewZgj-K DcvE msMŷ Kitz ntj MtelK wK cŷLqv AbyviY Kiteb?
  5. wkŷŷv MtelYv tŷŷŷ DcKityi cŷqvRbxqZv mstŷŷtc e`³ Kiab|

**cW 3**

**Z\_ msMā tKŠkj I DcKiY : cōqum I mgve×Zv**

**Dfīk**

GB cW tkfI AvciB —

- ◆ *wkŋv MtelYv KvRi Rb cōqvRbxq Z\_ msMāni tKŠkj mbv<sup>3</sup> KiZ cviṭeb Ges*
- ◆ *wetki tŋfī Dchŷ tKŠkj cōqum c×wZ eYbV KiZ cviṭeb|*

*Avgiv ceēZP`Bw cŋV Rvbjvg MtelYvi cKviṭf` Ges eŷtZ cŋjvg MtelK`tji w`iKZ.Dfīk` Abŋvqx wfbaŋfbaDcKiY e`envi Kiv nq| GB cŋV Avgiv Z\_ msMā Kivi KtqKwU tKŠkj m=ŋU AvtjvPbv Kie|*

*Avgiv`i me mgq gtb ivLtZ nte MtelYv nj, “a systematic process of inquiry consisting of three elements or components (1) a question, problem or hypothesis; (2) data; (3) analysis and interpretation of data (David Nunan) A\_ŋ wkŋv MtelYvq GKwU cKp mgm`v ev cĀ`\_vKte, DcvE msMā Kiv nte; DcvE wetk- IYceR e`vL`v cŋZ Kiv nte| DcvE Aek`B wbfŋhM` Ges h\_`v`ŋtZ nte|*

**Dcv<sup>3</sup> wKfite msMā Kiv m=ŋ?**

*tU=utj U, tPKuj ÷, Aa`i Z mŋŋvrKvi, repertory grid cKŋjv e`envi Kti – MtelK`j Zv`i cwKfbv chŋq w`i Kti tbb tKvb aiṭbi Kŋŋ`i mrvqZvq wK aiṭbi DcKiY e`envi Kti tKvb cōqum Z\_ msMā Kiṭeb|*

**cōZKZ cKŋjv**

*cKŋjv vi gva`tg Z\_ msMā Kivi cōqvRb hw` gvVKgŋwbṭqum Kiv nq Zte MtelYvi Dfīk` Abŋvqx thb DĒi Avtm tmw tK j ŋ` tiṭL gvV Kŋŋ`i Dchŷ cōkŋY w`tZ nte| DĒi`vZvi DĒtii`~OZv, mZ`Zv thb wvNz bv nq wKsev DĒi`vZv thb LvgtLqvj x DĒi cōvb bv KtiB Gw tK gvV Kŋŋ`i AZ`šmRvM`\_vKtZ nte| gvVKgŋ`th me wvltq tLqvj ivLteb tm`tjv n`O– DĒi`vZvK Ggbfite cKwKiṭeb bv thb Zu`~Zk<sup>3</sup> DĒi w`tZ AcviM Kti| gvVKgŋ`DĒi`vZvK mrvh` Kivi Rb`bvviKg visual aids e`envi KiZ cŋib|*

*cKŋjv cōZKivi mgq tLqvj ivLtZ nte thb MtelYvi cōqvRtb th aiṭbi Z\_ tLwRv n`O` , iazcY`cōkē gva`tg Zv AZ`šmWKfite thb cvlqv m=ŋ nq| [mŷivs cōtgB MtelK`j wK aiṭbi Z\_ Pvb Zv mŋŋŋfite tQvU tQvU evtK`i gva`tg wj ṭL thṭeb|*

**tKŠkj MZ e`vL`v**

*cōwK Ae`vq m` cōkŋY cōB gvV KŋŋMY mŋWKfite cKŋjv e`envi KiṭQb wKbv tm m=ŋU wvōZ nI qvi Rb` KtqKwU DĒi MāY chŋq AwvI tiKwŋS Gi e`v`v Kiv*

DipZ| gj- MtelK `tj i tKvb AwfA m`m` GB ti Kww`e`envi Kti gvV Kgf KvtRi  
`gp w`K, tjv mbv<sup>3</sup> KitZ mrvh` Kiteb|

**chfeqtYi gva`tg Z` msMh**

**wZxq tKSkj**

chfeqtYi gva`tg Z` msMh KitZ ntj MtelK `j tK cU`tgB Df`k` wbf` GKwU  
tPK wj ÷ cU`Z KitZ nte| GB tPK wj ÷ e`envi KvtR thb chfeqtYi `v`Q``teva  
Ktib tm Rtb` ZvtK cY`avi Yv w`tZ nte| tPK wj t÷i mwK e`envi Rvbr`vKtZ nte  
chfeqtYi KtK| wbitcqtYi te thb chfeqtYi KvrwU m`ubaeKiv m`e nq Zvi w`tK j`q`  
ivL`Z nte|

**cteqiKWRZ.Zt`i gva`tg Z` msMh**

**ZZxq tKSkj**

tKvb w`qv cU`Zv`bi w`qv`i GKv`wgK DrKl`Zv, tLj vajv w`lqK `qZv, w`tU,  
Dciv`Z e<sup>3</sup>Zv w`l`q cvi`w`Zv- Gme w`l`q Kvr KitZ ntj w`qv MtelKMY gva`wgK  
Z` e`envi KitZ cvtib| Gt`q`i tiKWRZ.Zt`i mZ`Zv hvPvB Kivi tKSkj RvbtZ  
nte| w`ba`i Z mgqmgvi gta` thb KvrwU m`ubaeKiv m`e nq tm Rtb` `f Zg mg`q  
Z` Avni Y tKSkj AvqtE`vKtZ nte Mtel`Ki |

gj- MtelK `tj i m`m`e,` hw` w`btRiv gvV chfeqi Z` msMh bv Ktib Zte gvV  
Kgf`i Rb` GKwU w`bt`Rgvjv `Zvi KitZ nte hvZ Zviv w`btR`i KvrwU Kivi m`yúo  
Bw`Z cvb| tKvb c`kæ`axti axti Kiteb, Klb w`eivg MhY Kiteb, Klb c`kæU  
wZxqevi D`PriY Kiteb, Klb DEi`vZvtK w`S`i KitZ ej`teb BZ`w` Bw`Z`vKte  
GB w`bt`Rgvj vq|

GB cvtV Avgiv t`L`Z tcjvg MtelYvi cU`qvRbxqZv mbv<sup>3</sup> Kiv, Df`k` w`ba`i Y Kiv  
thgb `iaZcY`wK tZgub `iaZcY`Z` msMh tKSkj w`ba`i Y Kiv Ges Z`  
msMh Kiv`xK c`k`qtYi gva`tg mwK fite cU`Z Kiv|



**cvtVvEi gj`vqb- 3**

- **msw`B DEi c`kæ**
  1. gvV chfeqi c`k`qvjv Rvvc KvtR mg`Zv`te Kvr nt`Q w`Kbv Zv chfeqtYi Kivi Rb` gj- MtelK w`K aitbi e`e`v`t`teb?
  2. chfeqtYi gva`tg w`K fite Z` msMh Kiv nq?
  3. cteqiKWRZ.Z` w`K fite GKRB MtelK e`envi Kiteb?

**cW 4**

**mvḡvrKvi tKŠkj**

**Dḡik**

GB cW tktl Avcb—

- ◆ mvḡvrKvi tKŠktj i `enkó" mbv<sup>3</sup> Kitz cviḡeb;
- ◆ mvḡvrKvi tKŠktj i cKvitf` wj LtZ cviḡeb Ges
- ◆ Mḡel Yv mvḡvrKviti i %ekó" eYḡv Kitz cviḡeb|

**mvḡvrKvi**

Mḡel Yvi Z\_ msMḡ tKŠkj wntmḡe e`eüZ mvḡvrKvi gj-Z wZbW `enkó" gwÉZ ntq \_vtK|

- Mḡel Yvi Dḡiḡk"i cḡ"ḡ cḡZdj b wntmḡe mvḡvrKvitiK cḡvb Z\_ msMḡni Dciq wntmḡe MY" Kiv mḡe|
- mvḡvrKviti i gvaḡḡ cḡĀ (hypothesis) hvPvB Kiv I cḡqvRbḡeḡa bZb cḡĀ Dc`vcb Kiv mḡe|
- Ab`vb" tKŠktj i mḡ\_ hḡfḡe e`envi Kḡi mvḡvrKvi tKŠkj Mḡel Yvi undertaking wntmḡe e`envi Kiv mḡe|

mvḡvrKvi tKŠkj mgnḡK tgvUvgwḡ Pvi fvM fvM Kiv nq|

- web`vmKZ.(structured) mvḡvrKvi
- Aweb`vmKZ.(unstructured) mvḡvrKvi
- Acwi Pwḡ Z (non-directive) mvḡvrKvi
- tK`ḡḡqZ ev wbt`ḡKZ (focused) mvḡvrKvi

cḡḡḡB Avgiv ḡḡMḡel Yv mvḡvrKviti ḡḡ avi Yvwi mḡ\_ cwi wPZ nB| BstiwR msÁvW wbgḡc—

“It is a two person conversation initiated by the interviewer for the specific purpose of obtaining research-relevant information and focused by him/her on content specified by research objectives of systematic description, prediction or explanation.” evsj vq ifcvšḡi Z Kiti msÁvW wbgḡc ntZ cviḡi—

mvḡvrKvi MḡYKvix KZR.Dl wcz `ḡ e`w<sup>3</sup> i Kḡ\_vcK\_b tK Mḡel Yv mvḡvrKvi ejv nq hLb GB Kḡ\_vcK\_tbi gvaḡḡ Mḡel Yv msḡvšl cḡqvRbxq Z\_ msMḡ Kiv nq| GLvḡb mvḡvrKviti i ce`wbaḡi Z welqe` Mḡel Yvi Dḡiḡk"i Dci wbfḡkxj Ges mvḡvrKviti i GKwḡ mḡyúo ḡḡl GB Dḡiḡk" KZR.wPwḡZ \_vtK| UvKg`vb Mḡel Yv mvḡvrKviti i KḡqKwḡ `enkó" mbv<sup>3</sup> KḡiḡQb thgb,

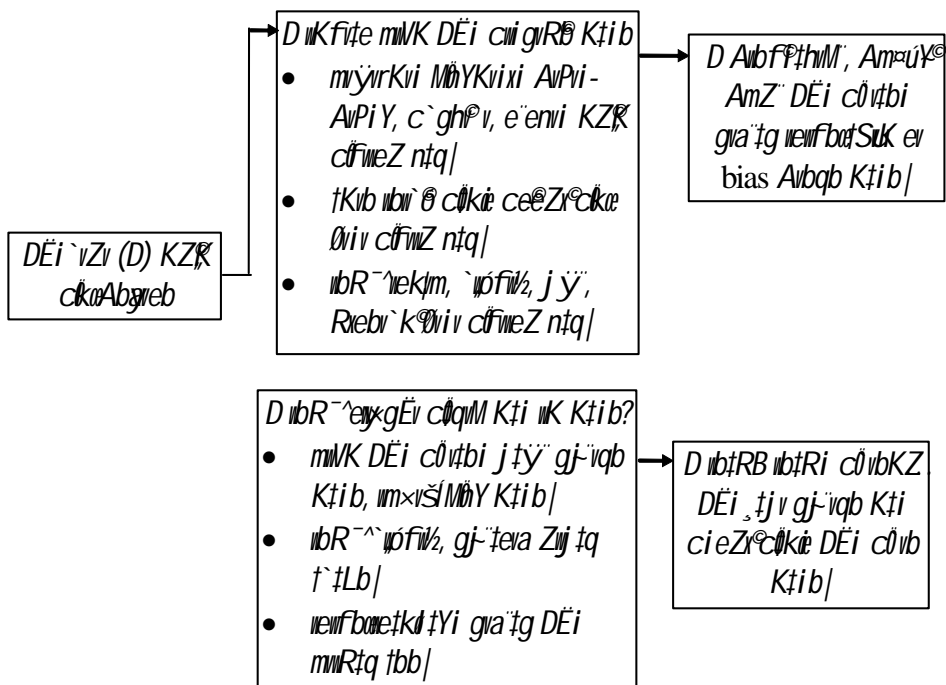
- GB ai#bi KvtRi Rb` mv`vrKvi MhYKvixi c0qvRb nq|
- Dch3 e`w3 ev e`w3eM#K A\_`mrvh` c0vb KitZ nq|
- ckaKivi ht\_o mjev \_vtK GB tKStj |
- Z\_` mstKvP#bi c0z m#ebv itqtQ|
- mv`vrKvi `vbKvixi msL`v ckgjvi mrvh` msMpxZ Mtel Yvq AskMhYKvixi tPtq A#bKvstK Kg nq|
- msMpxZ DE#i i msL`v ckgjv MtelYvi tPtq teik nq|
- Z\_` wefbaKvity weKZ.ntZ cvti, Gi gta` itqtQ mv`vrKvi MhYKvixi `gZv, DcKityi mxgexZv, Z\_` c0mque#Kityi mxgexZv BZ`w` |

Argiv Gevi Dctivj - wLZ Pvi cKvi tKStj i , Yv, Y wePvi Kie|

- Structured Gi t#t#1 weiqe` Ges c0mqu ce#ba#i Z nq| A\_# c0kae mg Ges MVb wK c0wzi nte Zv mv`vrKvi MhYKvixiK Rmbtq t`lqv nq dtj c0kae aviv cvieZ#bi tKvb `faxbZv Zvi \_vtK bv|
- Unstructured mv`vrKvi Ab`ct#D b#3 ai#bi A\_# GLvtb mv`vrKvi MhYKvixi `faxbZv eRvq \_vtK| MtelYvi c0qvRbxqZv Abjvqx c0kae aiY #ba#i Z ntj l G\_#jvi weiqe`; mg Ges kmak MVb mv`vrKvi MhYKvixi Dci wbf# Kti |
- Non-directive mv`vrKvi gj-Z tLivcx ev gtb#AvmbK mv`vrKvi ai#bi| GLvtb mv`vrKvi c0vbKvix Zvi B`Qv Ges #gZv Abjvqx Zvi gZev` ev AbjvZ c0kv Kti, A\_# GLvtb mv`vrKvi MhYKvix gj-Z tKvb cKvi wbt`Rbv t`b bv ej tj B P#j |
- Focussed ev wbt`kZ mv`vrKviti t#t#1 mv`vrKvi MhYKvix mv`vrKvi `vbKvixi Ggb GKwU cviwPZ Ae`v wbtq KivR Ktib thw MhYKvix c teB wek- lY KtitQb| eZgvb mv`vrKviti gva`tg ce#ba#i Z c0A MpxZ ev emRZ nlqv ct# ev wect# Z\_` msMh Ktib mv`vrKvi MhYKvix| A\_# GLvtb `vbKvix c0E mjbw` DE#i gva`tg GKwU e`w0 wicvU`c0Z Kiv nq|

MtelYv mv`vrKvi c0mquq hw` mv`vrKvi `vbKvix mwK DEi`v#b c0Z \_vtKb Ges MhYKvix cvi`umi K m#uk`vct#bi gva`tg hw` c0ZwU ckaMhYthvM`Zvi mvt\_ Dlvcb KitZ cvtib Zte GB tKStj i gva`tg tguUvgv wbt`# Z\_` Avni Y Kiv m#e|

Argiv Gevi t`Le DEi `vZv wKfivte m#e` DEi#K wbf#thvM` ev Awbf#thvM` Kti tZvtj b|



**OK 3-4.1 : DĒi ṽZvi `enkó` aviv**

Dcṽi i QṽK t`Lvb nj DĒi ṽZvṽK DĒi cġvṽbi Rb` wK aiṽbi cġwZ MṽhY KiṽZ nq Ges tKvb cwi w`wZṽZ ev wK KviṽY cġĒ Z`i ubfPṽhM`Zv nwm tctZ cṽti | Avgiv ejṽZ cwi cġgṽj vi gia`tg mWK DĒi cvl qv ubfP Kṽi “shared meaning” ev ṽṽA` fṽMvṽM Kiṽṽ tKṽkj D`metṽbi Dci | KvṽRB DĒi msMṽh Kiv ev Z` msMṽh Kiv c`xvZw Ggb nte thb Gi gia`tg DĒi ṽZvi ubw`ṽ j`ṽwfgṽ DĒi cġvṽbi ṽlgZv ew` Kṽi | DĒi ṽZv hṽ mWK DĒi ṽb c`xvZ t`ṽK `ṽi mṽi hvb Zte wZvb th aiṽbi DĒi cġvb Kiṽeb Zv invalidity Avbqb Kiṽe | MṽelK `tji gvKgp ev mṽṽvrKvi MṽhYKvixṽK G mg`l e`vcṽti mṽPZb t`ṽK j`ṽ`tji ubKU nṽZ ubfPṽhM` I cġZ.Z` msMṽh KiṽZ nte |



**cvṽVĒi gj`vqb- 4**

- msṽṽB DĒi cġae
- 1. MṽelYvi Z` msMṽh cġquvi Aṽf` mṽṽvrKvi tKṽkj KZ cġvṽii?
- 2. MṽelYv mṽṽvrKvṽi i gj` `enkó` wK wK?
- 3. ubṽ`wK ev tK` wqZ mṽṽvrKvṽi i mṽ` web`vmKZ.mṽṽvrKvṽi i gj` cv`R` wK?
- 4. DĒi ṽZv KZ cġvṽi cġĒ Z` ev DcvĒṽK ubfPṽhM` A`ev AubfPṽhM` Kṽi ZṽZ cvṽi b?

**cW 5**

**ckgvyv: cÖZ cÜvj x I e`envi**

**Dfik`**

GB cW tkfI Avcwb—

- ◆ MtelYv KvR e`eüZ ckgvyvi cKvif` ej tZ cvi teb;
- ◆ ckgvyv cÖzi mvavi Y wbgq eYv Ki tZ cvi teb Ges
- ◆ e`enviti i mvavi Y mveavbZv wPwYz Ki tZ cvi teb|

wkqv MtelYv D`Pzi e`AmbK MtelYvi gZ tkvb `vgx, Ruj MtelYmvi, m² hšcwzi e`envi br ntjI Pj | wKš MtelYvi wKQyDcKiY e`envi Ki tZB nte| ckgvyv G ai tbi GKw DcKiY| Avgiv G cvtV ckgvyv cÖZ Kivi mvavi Y wKQy wbgq wKLe Ges cÖZKZ.ckgvyv wKfite e`envi Ki tZ nq Zvl t`Le|

ckgvyvi gva`tg j q`j m`fÜ cÖqvRbxq Z\_` I DcvE msmh Kiv GKw eüj e`eüZ tKskj |

ckgvyv wZb cKviti— WwKthvM tciZ ckgvyv, `tji Dci cÖqMKZ.ckgvyv, e`w³MZ mvqvzi mgq e`eüZ ckgvyv| mvqi Avb m`ubæGes cÖkæ , iaz; Abæveb Kti wR`^AvMh cÖzi cÖkæ mwK DEi wPwYz Kiteb ev wj Lteb j q` `tji `enkó` m`fÜ GiKg m`æbv vKtj B WwKthvM ckgvyv tci tYi gva`tg DcvE msmh Kiv m`æ nq| Avgiv GiKg GKw e`envi t`L tZ cvB 1972 mtj MWZ ÖÖRvZxq wkqv Kwgbw Gi Kg`cÜvj tZ| GB Kwgbti wicvU`bta³ DjtL itqtQ:

ÖÖAvgv`i wkqv e`e`v I Zvi wewfbæmgm`v m`útk`RbgZ hvPvBtqi Rb` GKw ckgvyv t`tki wewfbæ`tji wkqv cÖZövb, bvbmea ms`v, wkqvZx, wkqvne` Ges tbZæ`i wKU tciZ nq| ckgvyv wU msev`cI gvi dZI cPwiZ nq| G e`vcviti tek Drvine`ÄK mvor cvlqv tMtQ| cÖB Reve,wj KwúDUvi Övív wetk- IY Kiv ntqtQ|ÖÖ

**cÖZcÜvj x**

ckæv ckgvyv `Zwi Kivi mgq wKQy, iazcYwbgq tgb Pj tZ nq, thgb:

- wK ai tbi Z\_` cÖqvRb Zv wbfj fite wYq Ki tZ nte|
- ckgvyvi bKkv wbaftYi tKskj wPwYz Ki tZ nte|
- cÖqvRbxq Z\_`tK mnRteva` cÖkæ gva`tg Ztj ai tZ nte|

ckæ`B cKviti nZ cviti – Ötki AvKviti Ges gZvgtZi AvKviti ev tLjv DEi |



**0tKi AvKti ev ibi 0 DĒigj-K cĕkĕ [Fixed response (closed) questions]**

G aiḡbi cĕkĕDĒi ḡZvi gZvgZ cĕkĕtki mḡhM ḡtKbv wKš MteIK Aí cwi kḡg DĒi weḡk- I ḡYi gvaḡg imxḡšf cĕkĕvZ cḡi b|

**tLvjv DĒi [Open ended (free) questions]**

GLḡb DĒi ḡZvi Aí Kḡvq tKvb wbi 0 weḡḡ Zvi wRḡgZvgZ eḡḡ KiḡZ cḡi b|

**cĕkĕvjv ḡZvi I cĕkĕMi cḡḡc**

- mḡmḡv wbi 0 Kti wí KiḡZ nḡe tKvb cĕkĕtĕi Zḡḡi gvaḡg DĒi cvl qv mḡe|
- (Dctivj- wLZ) ḡ cĕkĕtĕi gḡaḡ tKvbUḡZ KZw cĕkĕKiv nḡe?
- cĕg Lmov cḡZKiy|
- bgbv DĒi ḡZvi gvaḡg Lmov cĕkĕvj vi Mvb hvPvB|
- cĕB mḡvtj vPbvi wfwÉḡZ cĕg Lmov DbZKiy I Povšl cĕkĕvjv cḡZ Kiv|
- wbi 0 j ḡḡḡḡ i Dci cĕkĕvj wU cĕkĕM|

**ciYKZ cĕkĕvjv tdir cvl qvi ci hv Kiv nq Zv nḡḡ –**

- cĕB ciYKZ.cĕkĕvj vi DĒi tkYex Kti weḡkḡY Kiv|
- DĒti i wfwÉḡZ Povšl wḡcivUḡv gj- cĕZteḡb ḡZvi Kiv|

**cĕkĕvjv ḡZvi Kivi mḡq wḡgḡe weḡq, ḡjvi cĕZ ḡw wḡZ nḡe A\_ḡ cĕkĕvj vi ḡenkó nḡe wḡgḡc–**

- cĕkĕvj wU thb AvZwiḡḡ eo bv nq|
- evKḡ thb mnRḡevaḡ Ges tQvU nq|
- cĕkĕ gj-eḡḡe thb ḡi azcyḡGes ḡúofḡte eḡḡ nq|
- cĕkĕ DĒi ḡ evi ḡḡgZv BḡQv, Drmḡn thb j ḡḡḡḡ ḡj i ḡtK|
- wḡḡḡKZ cĕkĕ(leading question) thb GḡZ bv ḡtK|
- weḡfbacĕkĕ weḡq eḡḡi gḡaḡ thb avi v eRvq ḡtK|

**ckgij vi e`envi wK cŷqva Kitj fij dj cvlqv hte?**

WwKthvM tciZ ckgij vi tŷŷŷ GKwU msuŷŷB A\_P e`vL`vgj-K cŷ msthvRb KitZ nte thb DEi`vZv MtelŷKi cwiPq, MtelYvi weIqe`; cŷqvRbxqZv Dcj wä KitZ cvtib| ci-YKZ.ckgij v tdiZ cvl qvi Rb` Dchŷ WwK wUŷKUmN GKwU wKvbn tj Lv Lvg mieivn KitZ nte| ckgij v tciY Kivi `ŷ mBvŷni gŷa` GKwU ŷŷ`ŷi Ygj-K (reminder)ŷŷ wPw cvVŷZ nte| wPwi fvlv thb eÜZŷŷGes webqx nq tmw`ŷK `wŷ ivLŷZ nte|

e`wŷMZ mvŷŷv ev gvVKgŷ gva`tg th ckgij v e`envi Kiv nq tmLvŷb gvVKgŷ`i Dchŷ cŷkŷŷY w`ŷZ nte thb Zviv ckgij vi mwVK e`envi KitZ cvti |

`tj i Dci cŷqvMKZ.ckgij vi tŷŷŷŷI tgvUvgŷŷ GKB wbaq cŷhvR`|

gvVKgŷ gva`tg thme ckgij v ciY Kiv nte tmŷŷŷŷŷ tLqvj ivLŷZ nte thb gvVKgŷ`i AvPiY, DEi cŷvŷb ZvMv`v DEi`vZvi gŷa` weiwŷi Dŷ`K bv Kŷi |



**cvŷVvEi gj`vqb - 5**

• msuŷŷB DEi cŷŷe

1. wKŷŷ MtelYvi DcKiY wntmte ckgij vi e`envi wKifc? e`vL`v Kiab|
2. ckgij v`Zwi Kivi mgq tKvb tKvb wbaq tgŷb Pj ŷZ nq?
3. ckgij vi`enkŷ`mgŷ eYŷv Kiab|

**fiçKiv**

Pj gvb ev eZçvb Ae`v chçj vPbv Kçi DbçZi fıel`r MVb Kivi j tç` gvbly eüKiv  
 t\_tKB Mtel Yv Kçi AvmtQ| c`vci vtm wj Lb c`wZi Avne`vi, `çi gvbçli mvt\_`  
 thvMthvMi Rb` tUvj Mtdi Avne`vi t\_tK` ia eZçvb tUvj thvMthvM e`e`vq B-  
 tgBtçj i eüj e`envti i mçhM Mtel Yvi gva`tgB GtmtQ|

Mtel Yv bZb tKvb ZtEj cçqvRtb, bZb tKvb cçqvM e`e`vi mÜvçb cwi Pvj bv Kiv  
 nq| mZ` mÜvçv wntmte Mtel Yv KvR cwi Pvj bv KiçZ nçj mçw` ç cwi Kí bv Abçvçq  
 KvR KiçZ nq Ges Mtel Yv KvçRi Rb` A\_ç mgq l tjvKetçj i cçqvRb nq| tKvb  
 Mtel Yv KvçRi cçqvRbçZv t`Lv w`ç tKvb GKK Mtel K ev Mtel K `j Mtel Yv  
 KiçZ B`Qç nçj G KvçRi cçg c`ççc nj Mtel Yvi GKıU cççç cwi Kí bv ev  
 proposal cçZ Kiv|

Avçiv GB BDıbu Mtel Yv tçötçivRij cçwZ Ges e`envti i wewfbav`K wbtç Avtç vPbv  
 Kie|

cıV - 1 Mtel Yv tçötçivRij : , iaZçYç` K  
 cıV - 2 A\_ççB  
 cıV - 3 cçRtçi eYçv  
 cıV - 4 cçRtçi Kvççjvc  
 cıV - 5 Mtel Yv cçR± : D`vni Y  
 cıV - 6 Z\_` ti dvçiwçs tçççj  
 cıV - 7 Mtel Yv m`fç Kvçççv l cçZKi Y

**civ 1**

**MtelYv tčŭcivRij : , iazpYq K**

**Df`ik`**

GB civ tkfI Avcib —

- ◆ tčŭcivRij cŭZ Kivi wefbaŷ K, tjv mbr<sup>3</sup> KiŷZ cviŷeb|

tckvq ubtqmRZ t\_ŷK tckvMZ tKvb mgm`ivi mgvaib LŷR tei Kiv ev bZb tKvb ZŷEj Avne`vi ev tKvb Dbqŷ cKŷi i mvdj` gj`vqŷbi cŭqvRŷb MtelYv Kiv nq| MtelYvi cKwZ tgŷij K, e`enwi K ev Kvthŷc`thvMx th aiŷbi tnvK bv tKb GKvŷR i iæ t\_ŷK tkI chŷi AZ`ŷi cwi Kwŷ Zfvŷe GŷMŷZ nq| MtelKe,` KvR Kivi Rb` ZvB cŭtgB GKw KivRi cŭŷecŷ ev tčŭcivRij `Zwi Kŷib Ges GB tčŭcivRij Abjvŷi KivRw cwi Pvj bv Kiv nq| Ae`v wekŷI KvR PjvKvjxb mgŷq GŷZ Aŷ we`li cwi eZŷ, cwi gvRŷ Kiv ntj I cŭwgKfvŷe cŭZKZ.cŭŷecŷ ev proposal Abjvŷi B gj-Z KivRw Pŷj |

tčŭcivRij i ifcŷi Lv `Zwi i mgq th w K, tjvi cŭZ `wŷ w ŷZ nq Zv nt`Q—

- mgm`wU Abjvŷeb Kiv|
- mæŷe` mgvaŷbi w K ubŷ` Rbv tLwRv|
- mæŷe` mgvaib mbr<sup>3</sup> Kiv|
- cŷ`wKZ dj v dj Ges mŷav eYŷv Kiv|
- mgvaib ARŷbi j ŷŷ` MpxZe` c`ŷŷc ubYŷ Kiv|
- MtelYv KvR cwi Pvj bv Kivi Rb` cŭqvRbxq mæŷŷ`i cwi gvY ubaŷŷ Y Kiv|
- mgvaŷbi mæŷev ce`gj`vqb Kiv|
- cŷ`wKZ DcKvi ev mŷhvM cŷt gj`vqb Kiv|
- dj v dŷj i cwi gvYmgŷ mbr<sup>3</sup> Kiv|

GB bqwU c`ŷŷŷci Dci wfvE Kŷi maviY tčŭcivRij cŭZ Kiv nq|

MtelK`j cŭqvRb tevŷa GB bqwU , iazpYc`ŷŷcŷK GK ev GKwaK QŷKi AvKvŷi wj wceŷ KiŷZ cviŷeb|

**QK 4-1.1**

mgm`wU Abjvŷeb Kiv	Avŷj vPbvi gva`tg mgvaib tLwRv	mgvaib mbr <sup>3</sup> Kiv	cŷ`wKZ dj v dj I mŷav eYŷv Kiv	mgvaib ARŷbi j ŷŷ` MpxZe` c`ŷŷc mgŷ

**OK 4-1.2**

cᚱqRbxq mᚱú`	mgvaᚱᚱbi mᚱᚱebv cᚱt gj`vqb	cᚱ`wKZ mᚱhvᚱMi cᚱtgj`vqb	dj vdtj i cwi gvY

**mgm`v Abᚱieb Kiv**

**cᚱg c`ᚱc**

Mᚱel K (ev Mᚱel K `j) ᚱK cᚱᚱgB mgm`v ev Mᚱel Yv KᚱᚱRi cᚱqRb mᚱᚱú` ᚲᚱ avi Yv MoᚱZ nᚱe| ᚱKvb wᚱᚱKl NvUvZ ev NUbvi cᚱqRb ev kᚱZᚱ KviᚱY GB wᚱᚱKl mgm`vi Dᚱᚱᚱ nᚱᚱᚱQ ev cᚱqRbxqZv ᚱ`Lv wᚱᚱᚱᚱQ Zvi mᚱᚱúó Dᚱᚱᚱ ᚱvKᚱZ nᚱe ᚱcᚱᚱcᚱvᚱᚱᚱ |

**Avᚱj vPbvᚱ gva`ᚱg mgvaᚱb ᚱLvRv**

**wZᚱq c`ᚱc**

`ᚱᚱi mKj m`m` Avᚱj vPbv, chᚱᚱj vPbv Ges ceᚱZᚱ NUbvmgᚱ chᚱᚱᚱᚱᚱYi gva`ᚱg mgm`vUᚱi GKᚱU mᚱᚱᚱᚱ mgvaᚱb ᚱLvRvi c`ᚱcᚱcmgᚱ wPᚱᚱᚱZ Kᚱib| cᚱZ`K m`m` cᚱqRbxq msL`K AZᚱZ Z` ᚱLvRv ᚱ`ᚱK i iᚱKᚱi ᚲᚱᚱᚱ fᚱᚱᚱ wPᚱᚱᚱ Kᚱib Ges GKᚱU Av`kᚱmgvaᚱb ᚱᚱᚱᚱ nᚱᚱᚱ wK Kiv DᚱᚱZ Zv mᚱᚱᚱᚱ Kᚱᚱᚱ ᚱPᚱᚱ Kᚱib| i agᚱᚱ A`ᚱᚱ fᚱᚱᚱᚱ ZᚱK mgqᚱᚱᚱᚱ gᚱᚱᚱ bv Gᚱᚱ mgvaᚱbᚱᚱi j s Uvgᚱᚱᚱᚱᚱᚱᚱᚱ Zv ᚱLvRv DᚱᚱZ| GKB mgᚱᚱ A`ᚱᚱᚱ mᚱᚱᚱᚱ wPᚱᚱᚱ fᚱᚱᚱᚱ i iᚱKiv nᚱᚱᚱ

**mgvaᚱbmgᚱ mᚱᚱᚱᚱ Kiv**

**ZZᚱq c`ᚱc**

mᚱᚱᚱᚱ mgvaᚱᚱbi e`vᚱᚱᚱᚱ `j MZ fᚱᚱᚱᚱ wᚱᚱᚱᚱ Z I ᚱLvᚱᚱᚱᚱᚱ Avᚱj vPbv mᚱᚱᚱᚱᚱᚱ qvi ci Mᚱel K `j GK ev GKᚱᚱᚱK mgvaᚱb wPᚱᚱᚱZ Kᚱᚱᚱᚱ th`ᚱᚱᚱᚱᚱ cᚱZ Zᚱiv `ᚱᚱᚱ wᚱᚱᚱᚱ Kᚱᚱᚱᚱ| GB mgq Mᚱel Yvi hᚱᚱᚱᚱ ev rationale w`i Kiv nᚱᚱᚱ| rationale wPᚱᚱᚱZ Kivi mgq ᚱ`LᚱZ nᚱe

- GB hᚱᚱᚱᚱ i gva`ᚱg cwi Pᚱᚱᚱᚱ Z Mᚱel Yvi dj vdtj ᚱᚱᚱᚱ wPᚱᚱᚱZ mgᚱᚱᚱᚱ ev target group Gi DcKvi nᚱe wKbv|
- Mᚱel Yvi cᚱqRbxqZv Zᚱᚱᚱ aiv mᚱᚱᚱᚱ nᚱᚱᚱᚱ wKbv|
- ᚱKvb wᚱᚱᚱᚱ ᚱᚱᚱᚱᚱᚱ mᚱᚱᚱᚱᚱᚱ Kiv mᚱᚱᚱᚱ nᚱe wK?
- Ab` ᚱKvb Mᚱel K `j wK GKB mgm`v wᚱᚱᚱᚱ GKB mgᚱᚱ BᚱZᚱᚱᚱᚱᚱ Kᚱᚱᚱ i iᚱKᚱiᚱᚱ wKbv|
- A`ᚱᚱᚱᚱᚱ mᚱᚱᚱᚱᚱᚱ KZLᚱᚱᚱᚱ|
- GB Mᚱel Yvi dj vdtj i ᚱᚱᚱᚱᚱᚱᚱᚱᚱᚱᚱᚱ Ges fᚱᚱᚱᚱᚱᚱ Mᚱel KMᚱᚱᚱᚱᚱᚱ DcKZ. nevi mᚱᚱᚱᚱᚱᚱ wK cwi gvY|

**cZ`wkZ djvdj I mgyav eYBv Kiv**

**PZZc`tq/c**

MtelYij ä djvdj mivmwi c0qvM Kiv mæe ntj wK aitbi mgyav ev DcKvi cvlqv hvte Zvi GKuU Zvij Kv c0Z Kiv c0qvRb| RbMtYi `wófWzZ GB MtelYvi wK DcKwi Zv\_vKtZ cvti tmUvB Zvij tq t`LtZ nte G mgq|

**cAg c`tq/c**

**Kvh9máú`tbi c`tq/c máútkAvtj vPbv**

GB mgq gvV chiqi Kgpúbtqum, DcKiY PovšKiY, Kgf`i c0kqY, c0qvRbtefta I qvKRc AvtqvRb KitZ nte|

**Iô c`tq/c**

**máú`i c0B I c0qvRbxqZv**

Rbej I A\_`DftqiB c0qvRbxqZv I c0Bi mætebv Zvij tq t`LtZ nq GB mgq|

Rbmáú` I A\_`máú` c0Bi mætebv wfiEtZ MtelYv KvtrI mæe` mgyavb mgfni c0tgj`vqb Kiv nq G mgq| chiqj vPbvi dtj nqZ t`Lv tMj tKvb GK AwzK eo aitYi cwieZB Kiv c0qvRb| GiKg tqtI mg`l cwiKíbv Averí bZb Kti c0Z KitZ nq| GB c0:gj`vqtbí dtj AtbK mgq KvtrI Povš`e`\_Zv cwi nvi Kiv mæe nq|

**mBg c`tq/c**

cZ`wkZ DcKviti wfiEtZ c0tgj`vqb ceZP c`tq/cmgfñ MpxZ tKvb cwieWZ wmvtsí dtj Povš DcKviti c\_`áwš (off trade) nt`Q wKbv Zv LtR t`Lv nq Gmgq|

**c0B djvdjtj i gj`vqb mbv3 Kiv**

cZ`wkZ dj cvlqv hv`Q G máú`ú ubwDZ nlqvi Rb` c0qvRbxq KquU PjK ev indicator e`envi KitZ nte Zv mn G mgq Z\_` mSMh cxwZ Povšfivte w`i Kiv nq|

GB cvfV Avgiv MtelYv tc0civRvj wKlb cxwZ máú`ú c0\_wgK aviYv jvf Kijvg| cieZP cvW\_`tjvtZ Avgiv GtK GtK A\_`e0Bi mætebv, mgm`v wj Lb tKškj, c0R± eYBv Kiv, c0R±i Kvh`cxwZ, gj`vqtbí cwiKíbv, evtRU, `tj i qgZv I mgyvexZv wbtq Avtj vPbv Kie|



**cvfVvEi gj`vqb - 1**

- mswfjB DEi c0æ
- 1. MtelYv tc0civRvj c0Z Kivi `iaZjKZLvb?
- 2. tc0civRvtj i jctiLv `Zwi Kivi mgq tKvb w`tK `wó w`tZ nq?
- 3. MtelYvi thšw3KZv ev rationale wbaftY Kivi mgq tKvb w`K\_`tjv Zvij tq t`LtZ nq?

# A\_ċÜß

## Dġik

GB ciW tkġl Avcib —

- ◆ MġelYv KvġRi Rb" A\_ċÜßi cKviġf" wPwYz KiġZ cviġeb;
- ◆ MġelYv KvR mġúv`ġbi weifbæchġq th A\_ċe"q nġe Zvi mġte" cwiġvY wbaġġ Y KiġZ cviġeb Ges
- ◆ A\_ċÜßi mġtebv wPwYz KiġZ cviġeb|
- ◆ MÖU I K>Uġ± Gi ġta" cv\_ġ" mbr³ KiġZ cviġeb|

mwavi YZ MġelYv KvġRi Rb" th A\_ċe"q nq Zv `BwU ġġ- Drm ġ\_ġK cvl qvi mġtebv  
 \_vġKt mi Kvix Ges temi Kvix| mi Kvi U`v- Ges Ab`vb" weifbæivR`ġgva`ġg msMpxZ  
 Aġ\_P GKwU wbr`ġ Ask weifbæcġqvRbxq I Rb\_ iæZcYġw ġKi MġelYv KvġR Abÿvb,  
 ġġvb wntmġe cÖvġbi Rb" wbr`ġ Kġi ivġLb| mgvġRi abx, weĖKvj x e"ir³, Rb`i`x,  
 mgvRġmex e"ir³MY ġKvb wbr`ġ w`ġKi MġelYv KvġR cġqk A\_ċAbÿvb wntmġe cÖvb  
 Kġi \_vġKb|

MÖU Ges Pw³ wfiĖK KvġRi aviv mġġÜ cwiwPZ nl qv hvK Gevi| GB `BwU kġ  
 Avġiv AġbK mgq mgv\_ġ wntmġe e`envi Kiġġl ġġ`i ġta" , iæZcYġġġ- cv\_ġ"  
 iġqġQ| ġKvb e"ir³ MġelK ev MġelK `ġġK hLb Zvġ`i wbr`ġMġelYv KvR Kivi Rb"  
 A\_ċmrvh" ġ`qv nq ZLb ZvġK etġ MÖU| Acicġġġ ġKvb divġ, ġġRÝx hLb wbr`ġ  
 Pw³ cġġi ġva`ġg ġKvb `ġ, ġMvôx ev e"ir³ weġktli ġKvb wbr`ġ MġelYv Kivi mġġav  
 ÖÖµqÖÖ (buy) Kġi tbb ZLb ZvġK K>Uġ± etġ |

MÖU Ges K>Uġ± Gi ġta" tek wKQġġ ġġYxq cv\_ġ" iġqġQ|

K>Uġ± c×wZi ġva`ġg mi Kvix ms`vmġR RbMYġK ġmev cÖvġbi Rb" mi Kvix cġZövb  
 ev th ġKvb Aj vġRbK wKsev j vġRbK (profit) ms`vi mġġ\_ thwMġhvM `vcb Kġi| ġ  
 ġġġġ K>Uġ± Gi ġva`ġg A\_ċmrvh"ċÜß MġelK ev MġelYv ms`v MġelYv KvRwU  
 cwiPvj bv Kġib| MġelYvi wclqe`; c×wZ mspvšġ ġġ- wġġ`Rbv ev Kgġc×wZ  
 wġġqMkvix ms`v wK Kġi \_vġKb| ġaiġbi KvR AvBbMZ wġġġwZi Avl Zvq Kiv  
 nq|

MÖU cÜßi ġġġġ MġelK `ġ ev ms`v wġġġ`i cġġw Ges MwBW Gi bwwZġġv  
 Abÿvġi KvR Kivi Rb" iġvġġ A\_ċÜßi Rb" Avġe`b Kġib| ġġġġġ A\_ċmrvh"Kvix  
 ms`v ġKvb wġġ`Rveġġ ġ`b bv|

DfqtřřřřB Aek` ıbgqZıwřK cřřřř h\_vh\_ KZeřřři ıbkU Avře`b Křřř nq/  
A\_ćđvbkřıx ev mrvnh`Křıx cřřřř G mg`řıAvře`b vekřıA KřıgıUi gva`řg hrřvB  
ceřř Dchřř cřřı ev mgm`v ıU evQıvB Křřıb| mvariYZ GB vekřıA KřıgıUi cřıřPq  
mrvnh` cřřř Křřř Křřř Křı nq|

e`ıřMZ `vb ev Abřvb mvariYZ đıřřř k ev Křřřı křřı gva`řg cvř qv mře|  
Avkřısk třřř MY gva`řg cřřı ev vekřıBı gva`řg G mg`řımsev` cřřı Křı nq|  
Avřıv Geřřı t`křıq `ř GKřU Křřřř D`vniY t`Le|

**D`vniY 1**

evsjv GKřřřWgř ewřř mvariY mřv (1998) Gi KřřřveeıYřřZ GiKg `ř GKřU  
D`vniY mrvř Křı mře|

**D`vniY 2**

1997-98 A\_ćđı t\_řř GKřřřWgřřZ ıZb eđı tgqř ıZbıU MřelYv eřř cđvb Křı  
nřřřř| ıelqe`řřıv ıřř Rřebıv` `řřı KřıeZvı `řř AřřřY, b`b ZEř  
cřıř cřřřZ evsj vř`k KřıeZvı, evsj vř`k gřřřı I RřřZmsN|

**D`vniY 3**

GřıqřıUK tıııvBıU Ae evsj vř`k KZřř evsjv tıııvqř cřřř GKřU cřřřř Dř`M|  
GB Křřřř Rb` UGC, gřıbıqı vřřřř, UNESCO, mıKřıx vekře`vj qmgřř,  
CIDA Ges tıııvıx e`ısK A\_ćđvnh` cđvb Křřřř|

GřıqřıUK tıııvBıUi gva`řg Aveıı vekřı e`ıřemřřř.th mg`řıMřelYv Abřvb cđvb  
nq tıııv Aveıı e`ıřMZ chřřı Mřel Křřı Zřřı gřřř MřelYv Křřřř DrKřıZvı  
Rb` cřřřř.Křı nq|

MřelYv KřıřıUi cřřřřRbıqZvı, mgřřıvřřıı, Ges Dc`řcKZ.Křřřřř `řřř BZ`ıı  
ıı K vekřıPıv Křřı mřřıv Abřvb ev Křıřřř-Gı gva`řg A\_ćđvb Křřıb|



**cvřřı gřıvqb - 2**

- msřřř DĚı cřıe
- 1. Kq cřıřı MřelYv Křřřř Rb` A\_ćđıv qv mře?
- 2. MřU I Křıřřř MřelYv cřřřřı gřıv gřı cv`řřř, tıııv ıK?



**cōR±i eYᚱv**

**Dfīk**

GB civ tkfi Avciwb —

- ◆ cōR± eYᚱv ij Lb c×wZ m±fÜ e'vL'v cōvb Ki±Z cviᚱeb Ges
- ◆ cōR± Duj wLZ Dfīk'i cKvif` Ki±Z cviᚱeb|

cōR± KvᚱRi GKwU cYᚱᚱ Ges ᚦᚲ eYᚱv Qvov MᚱelYv KvᚱR mdj Zv jvf Kiv Am±e| GKwU cōR± eYᚱvq wZbwU , iazcYᚱAsk \_vᚱK| G , tjv nᚱᚱQ-

- j ᚱᚱ I Dfīk,
- Kgᚱ×wZ (Project activities) I
- gj`vqᚱbi cvi Kí bv|

Avgiv Rvnb, jᚱᚱ'i gvaᚱᚱg MᚱelYv Kgᚱᚱi AZ`śí`ieZᚱmgqmᚱgvi cōZ `wó ubeÜ Kiv nq| Ges Aí mgq mᚱgvi gᚱa` j ᚱᚱ ARᚱ Kiv m±e bq| j ᚱᚱ wbr ᚱ Kivi mgq ZvᚱZ MᚱelYv KvRwU th AĀtj cōqvM Kiv nᚱe Zvi Dᚱjᚱ \_vᚱK| A\_ᚱmᚱvᚱh` cōBi m±ᚱebv \_vKtj Avᚱe`b cᚱīi mᚱᚱ\_ j ᚱᚱ Dᚱjᚱ Ki±Z nq| j ᚱᚱ thb ᚱᚱki AvBbMZ mᚱᚱavi cvi cšx bv nq tm wᚱᚱK tLqj ivLᚱZ nᚱe|

Dfīk'i mᚱᚱ\_ m±úwKᚱ actions ev KvᚱRi gvaᚱᚱg j ᚱᚱ AvRᚱ nq| mᚱᚱivs Dfīk` ᚦᚱó, ARᚱthvM` Ges cvi gvcᚱthvM` nᚱe| Dfīk'i gvaᚱᚱg tevSv m±e th MᚱelYv KvRwU Ki±Z wK cvi gvY mgq j vMᚱe| mᚱavi YZ cōZwU cōR± AšZcᚱᚱ wZb/PviwU AvPivYK Dfīk` wPivᚱZ Kiv m±e|

Dfīk` ᚱᚱ cKvfi nq – cōqvMZ Ges djvdj MZ|

**cōqvMZ Dfīk` ev Process Objectives**

Kvg` j ᚱᚱ`tj tcᚱᚱvbi Rb` wK aiᚱYi c`ᚱᚱc MᚱY Ki±Z nᚱe ev wK cōqvᚱq KvR Ki±Z nᚱe Zvi eYᚱv \_vᚱK cōqvMZ Dfīk`; wKš` j ᚱᚱ`tji Dci Gi m±ᚱe` djvdᚱj i tKvb Dᚱjᚱ \_vᚱK bv GᚱZ| GB aiᚱYi Dfīk` wPivᚱZ Kivi gvaᚱᚱg th mg`l cixᚱY m±úbæKiv nᚱe ev th aiᚱYi Dᚱᚱᚱᚱᚱᚱᚱ-K tKškj cōqvM Kiv nᚱe tm m±fÜ aviYv ARᚱ Kiv m±e nq|

**djvdj MZ Dfīk` ev Outcome Objectives**

GB aiᚱbi Dfīk` GKwU mᚱᚱvᚱ ᚱ j ᚱᚱ`jᚱK wPivᚱZ Kᚱi Ges Gi Dci KvR Kiv nᚱj wK aiᚱYi djvdj cvlqv hᚱᚱe ZvI Rvbr m±e nq| djvdj MZ Dfīk`i gvaᚱᚱg AvPiY, ᚱᚱZv, ᚱᚱfᚱᚱ, gj`ᚱeva, wᚱkᚱm, Ávb Ges kZᚱᚱᚱᚱi cvi eZᚱ m±fÜ Rvbr

mæ nq| mŷw`θfvte e<sup>3</sup> djvdj MZ Df`k`i gta` wbtg<sup>3</sup> `enkó` we`gvb  
\_vkte –

- mgqmŷv
- j ʃ`j
- th msL`K RbMfYi KvQ tcŷvfv nte Zvi Dfj
- cZ`vkZ Ges cwi gvc`thM` djvdj ev Dckvi
- tŷMŷj K `vb ev cixʃfYi j ʃ`j |

Df`k`i gva`tg j ʃ`j i eqm, wj ½, Av`w KZv wPwYZ Kiv mæ| Df`k`i wj Lvi  
mgq action verb (thgb: eŷx Kiv, msfKvPb Kiv, cŷkθ Kiv, Kwgtq t`qv) e`envi  
Kiv nq|

Df`k`i wPwYZ Kivi mgq MtelK/MtelK `j`K Mfxi fvte wPŷf fvbr Kti w`i KitZ  
nte Zuv Avmtj wK Pvb –

ŷŷKvb wefkl welfq j ʃ`j i Avb eŷx Kiv hvfZ Kti Zv`i AvPiY cwi ewZŷ nq?ŷŷ  
tmfʃf`f e`vcv wK GiKg th, j ʃ`j cŷqvRbxZv Avb AvQ wKB wKŷ Zviv  
KwŷʃZ I `v`mæZ AvPiY KitQb br; A\_ŷ MtelYv djvdj cŷqvM`i gva`tg axfi  
axfi GB j ʃ`j`K AvPiYi cwi eZθ NUvZ mæZ Kivfv mæ nte|

**D`niY**

Avgiv GKw cŷvkZ we`wBi gva`tg ev`e D`niY t`LZ cwi– 1999 mtj tg  
gvfmi `wbtK cŷvkZ GKw we`wBi Ask wefkl Zfj aiv nj | we`wBi cŷvi  
KtiwQj ŷŷvdtgj tmfKŷvix `ŷ G`mm÷`vY cŷR±ŷŷ wKŷv gŷŷYj q|

ŷeisj v`k brix wKŷvi nvi eŷx Ges Dbqb KgRvŷŷ brix mgvRi e`vcK AskMŷY  
wbuŷZ Kivi j`ʃ`f t`k`i 118w \_vbrq cŷfif<sup>3</sup> wKŷv cŷZŷvfb gva`wK `fii  
Qv`f`i Rb` DceŷE I wUDkb wd cŷvfb gva`tg Qv`wmsL`v eŷx cŷf`i Ab`Zg  
Df`k`i|ŷŷ

GKw ev`Kvfi j ʃ`j ev`evqfbi Rb` ARŷthM` GKw Df`k`i wPwYZ Kiv nqtQ  
GLvfb| Df`k`i gta` tŷMŷj K `vbi eYŷv itqtQ, j ʃ`j Dfj itqtQ,  
BZ`w` |

**mveavZv**

cŷR± tcŷcvRv`fj Df`k`i wj Levi mgq th w`k `w`w`fZ nte Zv n`Q –

- GKw Df`k`i gva`tg GKw gv`f cwi gvc`thM` Outcome MY` KitZ nte|
- AvZwi<sup>3</sup> eYŷv thb Df`k`i gta` mibtevkZ br nq|
- Df`k`i thb mnRfava` Ges `uó nq|
- Df`k`i eYŷv thb ev`evbM nq Ges AvkwZwi<sup>3</sup> cŷZAv thb GfZ br \_v`K|

ḡ Ae GWKKb

weḡkI Kḡi A\_ḡvnh" MḡY Kḡi MḡeIYv KvR Kiḡj j ḡ" iḡLḡZ nḡe thb AḡZwi<sup>3</sup>  
Dḡiḡk"i eYḡv cḡB dj vḡj ḡK ḡḡhḡ\_ó bḡḡḡ eḡj ḡPḡYḡZ bḡv Kḡi | KvIY GiKg mḡḡebḡ  
ḡ`Lv ḡḡj mḡvnh"Kḡix mḡ`v A\_ḡḡvḡb AmḡḡZ cḡvḡb KiḡZ cḡḡi |



### **cḡḡVḡḡi ḡj`vḡb - 3**

- **mḡḡḡB Dḡḡi cḡḡe**

1. MḡeIYv cḡRḡ ḡcḡḡcḡRḡḡj ḡḡvU KḡḡU , iḡZcYḡAsk\_ḡḡK?
2. MḡeIYv cḡRḡ KvRi ḡḡa" Dḡj ḡLZ Dḡiḡk" Kḡ cḡKḡḡi i nḡZ cḡḡi?
3. cḡRḡ ḡcḡḡcḡRḡḡj Dḡiḡk" ḡj Levi mḡḡ ḡKḡb ḡKḡb ḡḡ ḡK `ḡó ḡḡ ḡZ nḡe?

**civ 4**

**c0R±i KvhRj vc**

**Df`ik`**

GB civ tk`l Avcib —

- ◆ c0R±i KvhRj vc eY0v Ki`Z cvi`eb;
- ◆ c0R± tc0civRvtj i weifbæAsk c0Z Kivi tKŠkj e`vL`v Ki`Z cvi`eb Ges
- ◆ c0R± KvhRj vc c0Z Kivi c0vj Z OKmg#ni eY0v w`tz cvi`eb|

tKvb Mtel Yv c0R±i KvhRj vc ev activity AskB me#Ptq , iaZcY0 GB Astki eY0vi gva`tg tevSv hrte Mtel K miZ`Kvi A#\_0K Ki`Z Pvb, Ges tKvb mgq ti Lvi (time frame) gva`tg Mtel YmU m#ubæKiv nte|

mvi Yx 4-4.1 Gi gZ GKwU I q0KwU (work sheet) `Zwi Kti KvR iia Ki`j tgvUvgv me , tj v KvhRj vc ij ice# Kiv m#e nte Ges tKvb Ask ev` cotebv|

**mvi Yx 4-4.1: c0R± KvhRj vc ij ice# Kivi OK**

c0R±i Df`ik`mgn	cvi Kw`Z KvR ----- ----- -----		c0R± Kv`Ri gj`vqb
	KvhRj vc (c0Zgj-K)	ev`evqbKiv xb KvhRj vc	
c0Z`mkZ dj v dj ev DcKi Y wk wk			wk ai`Yi gj`vqtb gva`tg wby0 Kiv nte th KvR c0Z`mkZ dj etq Gtb0?

**cvi Kw`Z KvR**

hw` 00gv I wk`i i `r` m#PZbZv ew# Kiv00 msµvšf tKvb Mtel Yv KvR nvtZ tbqv nq Zte I qvRkxU Gi cvi Kw`Z KvR (Services planned) Astk wbgæjc Df`l \_vKtZ cvi`i —

- 18-34 ermi eqmx gunj vt`i gta` 200wU 00`r` i 0v00 wbdR tj Uvi gyY Kti weZiY Ki`Z nte|
- 118wU \_vbvq cKif,3 wk0v c0Z0v`b gva`wgK `f`i i QvT`i i DcewE c0vb Kiv nte|

Gevi Avgi v t`Le c0Zgj-K I ev`evqbthwM` KvhRj vc ej`tz wk tevSvq?

### **c0vZgj-K KvhRj vc**

MteIYv c0R± KVR iiaKivi Rb" m=úY©Kv†Ri GKwU Zvuj Kv c0Z Kiv c0qvRb| Kv†Ri wk†ivbvtgi mv†\_ th e"v3 KVRwU m=úbæKi†eb Zvi msr¶B cwi Pq Ges KVRwU Kivi Rb" KZUKzngtqi c0qvRb tm m†ei D†j L \_vK†e GB KvhZvuj Kvq|

thgb G†Z \_vK†Z cv†i –

- wbtqvM cwi Kí bv
- vb/mvæavw`i eY0v
- w†kl DcKiY/hšçwZi Zvuj Kv
- c0ZthvM" e`i Zvuj Kv
- mnthvMxZvgj-K Kv†Ri eY0v
- Gj vKwfvE K RbM†Yi m=ú"3 Zv
- j ¶" `†j i Kv†Q tc0w†bvi tKŠkj |

### **ev`évb†hvm` KvhRj vc**

j ¶" `†j i mv†\_ thvM†hvm` vcb Kiv mn Zv†`i mv†\_ msthvM i ¶vi gva`tg Kv†Ri aviv wK tKŠk†j Pj †e Zvi B eY0v \_v†K GB A†k| mvavi YZ RbKj vYvgj-K tc0M0ngs PviwU c0vb f†M wef3 \_v†K| thgb –

- c0k¶Y ev wK¶v;
- Z\_` mwb†ek l w`li Y Kiv;
- civgk¶ Ab`vb" mvrh`Kvix mvr¶¶ Ges
- m=ú†`i thvMvb t`l qv|

### **c0R± gj`vqb**

c0R± KvhRjvc kx†Ui GBwU tkl avc| D†i†k`i Dci wfvE K†i Ges wK ai†Yi mvr¶¶ t`l qv n†e Zvi cwi Kí bvi c0Z j ¶" ti†L c0Z`mwkZ djvdj AR¶bi tKŠkj eY0v Kiv nq GB A†k| gj-Z GB A†k 00D†i`k" c0Zdij Z ntqtQ wKbv Zv wK f†te wbu0Z n l qv hv†e0 GB c0k†e D†i \_v†K|

### **cY0% c0R± KvhRjvc wj Lb**

KvhRjvc kx†Ui wvr¶bæLÜvsk t\_†K Gevi cY0% KvhRjvc c0Z Ki†Z n†e| w†kl K†i emn:A\_©c0vbKvix ms`v w†cv†U¶ mv†\_ KvhRjvc c0v†bi wbt`R t`q| Project activity ev c0R± KvhRjvc c0Z Kivi PviwU c0w†j Z QK ev format Av†Q| G\_†j v n†`Q: eY0vgj-K, ifc†i Lvgj-K, Kv†Ri m=úe`Zvgj-K, l mgqmvgvgj-K|

**eYbvgj-K OK**

eYbvgj-K cKv`ii gta` Df`ik` ev`evqtb cwi Kíbv Ges tKvb GKIU me`kl Aw`zK Aej`ab Kti KvtRi c`arb KviY ev rationale eYb`v Kiv c`arb` c`iq| tKvb ai`Yi KivR Kiv nte Ges wKfite G`tjv Kiv nte ZviB eYb`v`v`K GB Q`K|

**maviYZ GtZ vbtax` Askmgv`v`K -**

fvgKv, `vb/mv`eavi vbe`pb, Kgp`vbtqvm cwi Kíbv, DcKiY ev nviZqvi vbg`p, me`kl DcKi`Yi eYb`v, mn`thvMZvgj-K KvtRi eYb`v, KgybuU ev Av`Aj K m`u`Zv, mvi`vsk, BZ`w` |

**ifctiLvqj-K OK**

GB cx`vZtZ KvhRj vcmgn`K GKIU me`kl j`q` I Df`ik`i mvt` m`u`KZ Kiv nq| wK Kiv ntq`Q Ges cL`vkv wK wQj GB `tqi gta` m`yúo m`u`K`c`k` Kiv nq GB Q`K|

**KvtRi m`te`Zvgj-K OK**

GB ai`Yi Q`K ifctiLvi gZB KivR Kiv nq, Zte GLv`b gj`vqb cwi Kíbv| mn`thvMZv nq|

**mgqmvgvj-K ev Time Line OK**

A\_`mivh`Kvix ms`v MtelYv KivRvUi mgqmvgv m`tU Jrmj` c`Kvk Kitz cvti GB w`tkj`q` ti`L GB Q`K c`ZvU `fii vbw`v mgtqi D`tj`v`v`K|

g`b ivL`teb, c`ZvU t`c`vRv`j Organizational Structure Ges Starting plan ev Kgp` vbtqv`Mi cwi Kíbv`v`Kte| maviYZ G`tjv cwi w`kó Astk`v`K|

Avgiv GB cvtV t`Ljvg c`R± IqvK`m`tU tKvb Ask`tjv`v`K Ges cieZ`Z GB mg`v`Askmg`ni msv`v`B eYb`v| tcjvg GB cvtV|



**cvtVv`Ei gj`vqb - 4**

**• msv`v`B D`Ei c`k`e**

1. c`R±i IqvK`m`tU wK ai`bi eYb`v`v`Ktj GKRb MtelK vbw`v`sg`tb KivR Kitz cvtib?
2. c`Y`z c`R± KvhRj v`c` tKvb v`elq mib`v`w`KZ`v`Kte?



cYWKiv: -----

mgqmigv: Rvbyvi x 1998 n`Z MWtm`f 2002

cOR± cwi Pij K Ges c`vb m`uv`K: -----

gva`g: gY Ges CD-ROM

fiv: eisj v Ges Bst`i Rx

Aiv Kvi Ges gva`g: -----

m`te` GwU`msL`v: 25000

j`j` : MtelK, tckvRme, uk`K, uk`v` , mi Kvi x Ges temi Kvi x ms`v, mef` kx  
ugkb, em: eisj v` kx, `v`Y Gkxq ÷ v`v` tK` ` Ges mivavi Y c`VK |

cO`ij Z e`q: -----

cZ`vkZ Dm: -----

GukqviUK tmviviBui GB cOR± vi`civU(1998) eY`vgj-K e`L`v tK`kj (civ 4  
`be`) Aej`b Kti cO`igK tO`civRij Dc`vcb Kti`Q| GtZ th mg`I Ask i`q`Q  
Zv n`Q-

- msAv I Dti`k`
- j`j` I e`envi thvM`Zv
- cOR± Cx`Z (Project Methodology)
- tj LK `Z; Ges DrKI`Zv v`q`S`Y
- cOR± Kv`Ri AM`v`Z
- `u`Yi KZ .msMv
- A\_`c`B
- e`e`vcbv
- Abv`
- c`k`Y
- Kg`j I Kg`cwi Kí bv
- e`emvqK cwi Kí bv
- DcKvi
- fiv`r DrKI`Zvi cwi Kí bv|

Dcti i `Bui D`vniY ch`j vPbv Kivi ci cOR± tO`civRij Gi Mv m`fÜ Avcbv` i  
v`oq `^Q avi Yv n`q`Q| e`stZ tcti`Qb th, MtelK ev MtelK `j v`R`^Pv`v, A\_`



ḡ Ae GWKkb

mrvh"Kvix ms̄vi cḡqvRbxqZv Abv̄v̄i th tKvb Rbucḡ M̄elYv ḡW̄t̄j i w̄KQy  
c̄v̄ieZḡ K̄ti w̄bR̄^GK̄w̄ K̄vh̄R̄i M̄elYv ḡW̄t̄j ḡZ̄v̄i K̄ti w̄b̄Z̄ c̄v̄t̄i b̄|



## c̄v̄t̄V̄Ēi ḡj̄v̄q̄b- 5

- m̄s̄w̄j̄B̄ D̄Ēi c̄k̄æ

1. cḡR± tcḡc̄v̄R̄v̄t̄j i īf̄c̄t̄i L̄vi ḡt̄ā t̄Kvb , īæZ̄c̄ȲAsk , t̄j v̄\_ v̄t̄K?
2. Ḡv̄k̄q̄v̄i UK t̄m̄v̄v̄B̄iLi th cḡR±w̄ eZḡvb c̄v̄t̄V̄ D̄v̄ni Ȳ w̄t̄m̄t̄e Dc̄v̄cb K̄iv̄ n̄t̄"Q  
Z̄v̄t̄Z̄ ḡḡf̄v̄el̄r Dr̄K̄ĪZ̄vi c̄v̄i K̄i b̄v̄ḡḡ b̄v̄t̄ḡ GK̄w̄ Ask īt̄q̄t̄Q| GB Āt̄ki  
cḡqvRbxqZv ēv̄L̄v̄ K̄i āb̄|

## Z\_`tidvřivřs tKřkj

### Dřřk`

GB civ řkřl Avcřb —

- ◆ Mřel Yř KvřRi Rb` gva`řgK Z\_` msMřni Dřm mbr<sup>3</sup> KiřZ cviřeb;
- ◆ Mřel Yř KvřR e`eüZ Z\_` Dc`řcb c×řZ eYřv KiřZ cviřeb Ges
- ◆ `řKZ.tidvřivřs tKřkj cřřqřM KiřZ cviřeb|

Mřel KřK th tKřb Mřel Yř KvřR ıbhř nevi cřg c`řřc nj tKřb cřřj Z ZĚ; e`e`ř, c×řZ, tKřkj i gřa` tKřb mřgře×Zř, AmřúřZř AvřQ ıKbv Zř mbr<sup>3</sup> Kiv| mřřivřs th tKřb Mřel K Mřel Yř cřřgK chřřq `řKZ.Rıvřř, eB, řiKW<sup>9</sup>, řj j LřR řei Křib th mgm`řU ıbtq řZřb KřR KiřZ AvMřř řm mřúřK<sup>9</sup>ev Gi mřř mřúřKř tKřb mgm`ř ıbtq ceřZř mgřq tKřb Mřel Yř nřqřQ ıKbv, nřq `řKřj Zři dj řdj ıK| GB mg`řcřřqřRb AvřQ etj Avgiv Rıvb, Mřel Yř KvřR gva`řgK Zř`i e`envi l eüj cřřj Z| Gme řewřbřeKřivřř GKRb Mřel KřK Rıvřř nq řZřb Zř`i mřvřb ıK aıřři Dřřmi KřřQ hřřeb, msMřřZ Z\_` ıKřře e`envi Kiřeb Ges Mřel Yř ıřřcřv<sup>9</sup> ev ř mřřmi gřa` Z\_` řej x ıKřře mřřřvřb Kiřeb|

Mřel K Mřel Yř KvřRi mgm`ř Ges thřř<sup>3</sup>KZř ıPřřřZ Kivi ci řewřbřeřiKW<sup>9</sup>, ıřřcřv<sup>9</sup> Mřři řře chřřj řPbv Křib| GRřb` ZřřK Zř`i Dřřmi cřřZ. ıbřřř Y KiřZ nq| thgb řřcřřgřivř ıKřřř mřřřřř tKřb ceřZř Mřel Yř KřR ř`LřZ nřj Mřel KřK gqgbřmřni Rvřřq cřřgK ıKřřř GKřřřgři MřřřMřři thřř nře| Mřel Yř cřřZ. l Dřřk` eYřv Kři GRb` řZřb ceřřřB mřřřř cřřZřvb cřřřři ıbKU mivřmi ev MřřřMřři řKi gva`řg řcřřř Z cřř řřiv MřřřMřři e`envi ři Absřřř Mřř Y Kiřeb|

evsj vř`řk řewřZKřřvř ıKřřř Mřel Yř mřřřřř Z\_` msMř KiřZ nřj Mřel K mřřivřř cřřřgB BANSDOC, BANBEIS, ıKřřK cřřřřř gřřve`řj qmğřni MřřřMřři Ges řvřvř wekře`řj řqi ıKřřř l Mřel Yř Bbřř`řDřřři MřřřMřři mivřř` Mřř Y Kiřeb| evsj vř`k Dbřř wekře`řj řq ıbR`^tKřb Mřel Yř agřD`PZi chřřqi ıKřřř řcřřřg GLřbv Přj řbv nřj l Dbřř ıKřř c×řZi Dci th mg`řMřel Yř nřqřQ řm, řj v mřřř ıKřřZ\_` cřř qř hřře evDřeři MřřřMřři |

mřřřřřKřřřř th tKřb Mřel K Křřřřřř e`envi ři řřiv Břřřřř, www, eřDřřř mřřřř gva`řg cřřřeř th tKřb ř`k ev cřřřř nřZ ıbR`^Mřel Yř mřř mřřřřř Z\_` msMř KiřZ cřřřb| Gi Rb` Mřel KřK Křřřřřř e`envi ři gva`řg Břřřřř mřřřř e`envi KiřZ nře| GB e`e`ř LiP mřřřřř Ges cřřřř l Křřřřřř ıbřřř etj evsj vř`řki ıKřřř Mřel Yř řřřřř GřU GLřbv eüj Rbřřřřř ARř Kři bvř| mřřřivřs, evsj vř`řki eZřřvb cřřř řZřř G Avřřřřř tKřb , iřřřřřZ\_` cřř qř hřře břř|

ġ Ae GWKKb

Avġiv Rmb th, gvV chġq wbtR gva'wgK Z\_ msMh KvR AskMhY Kivi cte<sup>©</sup> MtelKtK G m<sup>†</sup>U Dch<sup>ŷ</sup> cŵwZ MhY KiZ nq| tKvb MšvMvi nZ tKvb cKwZi Z\_ msMh Kiv m<sup>†</sup>e tm m<sup>†</sup>U GKwU cŵwZK avi Yv msMh Kti cwi Kí bvi Abjvqx KvR KiZ nte| bZev A\_<sup>©</sup> mgq Dftqib AcPq nZ cŵi; GB AcPq Averi gj- cwi Kí bvi Dci tbwZevPK cŵve ivLte|

**cKwKZ Z\_ ev WKtU wtk- IY GKRb MtelKtK wKfite mnvh Kti?**

- mgm'vi wKueZ<sup>©</sup> ev mgag<sup>©</sup> Ab'ib" mgm'v Ab" tKvb MtelK wK Avwztk wtkdY KtiQb Zv Rvbr m<sup>†</sup>e|
- mgm'wM' wcl qe'í AZxZ BwZnm msMh KiZ mnvh" Kti|
- tKvb cŵqvRbxq gva'wgK Z\_ msMh Kiv m<sup>†</sup>e|
- MtelYvi thšw<sup>©</sup>KZv, Dfík", Z\_ msMhKvix hšMvcthMx, mWk, Kvhrí Z\_ msMh KiZ mg\_ q<sup>†</sup>q<sup>†</sup>Qb wKbv Zv RvbtZ mnvh" Kti|

**WKtU wtkdYi gva'g msikó mgm'wli AbjvubKZ Z\_ msMh Kiv m<sup>†</sup>e|**

WKtU wtkdYi m<sup>†</sup>av mgr wbgie/c –

- msMpxZ Z\_ wMZKvj xb Zt\_í mZ"Zv cŵZwZ Kti|
- cKwvj v, mvŋvrKvi BZ" w tKšktj i gva'g msMpxZ Z\_ Atcŋv G aitbi Z\_ AwakZi wklmthvM" nZ cŵi|
- WKtU msŋŋB Ges Gi mnR e"enivcthMxZv i<sup>†</sup>q<sup>†</sup>Q|
- Z\_ cŵqM thvM" Ae"vq cvl qv m<sup>†</sup>e|
- Z\_ AZ"šíAí A\_<sup>©</sup>iq msMh Kiv m<sup>†</sup>e|

MtelK Zvi MtelYv m<sup>†</sup>úK<sup>©</sup> w\_mxm ev wicvU<sup>©</sup>wKfite e"eüZ Zt\_í Dm Dfj- L Ki<sup>†</sup>eb?

Z\_ cÄx wj wce<sup>x</sup> Kivi AvšRwZK wKQybg Av<sup>†</sup>Q| gj-Z`Bw tKškj ev cŵqv eüj e"eüZ|

GKwU cŵqvq cŵvi th"v<sup>†</sup>b Z\_ w e"eüZ n<sup>†</sup>q<sup>†</sup>Q wK tmLv<sup>†</sup>bB tidv<sup>†</sup>iY wj wce<sup>x</sup> Kiv nq, thgb –

**cŵg tKškj**

“Development in qualitative field methodology such as “theoretical sampling” (Glaser and 1967), “Conceptual mapping” and “Curriculum mapping” (Weinstes 1986),-----”

GLv`b wZbU tgšij K avi Yv “theoretical mapping” Ges “Conceptual mapping” and “Curriculum mapping” hviv cŭgeŭi gZ Dc`vcb Kti`Qb Zv`i bvtgi c`ex Ask Ges cKvkbvi ermi cŭg eŭbxi gta` Dtj` Kiv ntqtQ| Ges Mšsi tkŭi tj LK cÄvZ alphabetically Gt`i bvg vbtge`i`c Dtj` Kiv ntqtQ|

Glaser, B. and Strauss, A.(1967) The Discovery of Grounded Theory : Strategies for Qualitative Research Chicago: Aldine.

A\_ŭ t`Lv hv`Q tj LK ev m`uv`tki bvtgi c`ex ctjivlv emtq Ab` bvg th, tj vtK BstivRtZ First name, Middle name etj Zvi Av`ŭi tj Lv nq, Zvici cŭg eŭbxi gta` cKvtki ermi tj Lv nq, Zvici Mš` ev iPbv ev cŭUv vktivbvg Gici cKvktKi bvg I t`k ev knŭi bvtgi Dtj` \_vtK|

Z\_`v tkvb cKvKZ Rvbŭ ntZ Pqb Kiv ntj ZLb ZvtZ Vol. no. Ges ct b`fi Dtj- L KiZ nq| thgb –

Carr, W. (1989) Action research : Ten years *Journal of Curriculum Studies*, 21 (1) 85-90.

GLv`b Rvbŭ vUv vktivbvg Italics Aŭi ÷vBtj Qvcv`bn nq, 21 nj Volume bs (1) msL`v bs, 85-90 th cŭv, tj vtZ cŭUv Qvcv ntqtQ Zvi Dtj`|

**vZvq tKšj**

“Isaac and Michael <sup>9</sup>, for example, quote a study by Coonbach which -----” GLv`b i`agv` bvtgi Dcti <sup>9</sup> msL`vU emv`bn ntqtQ| cti Aa`vtqi tkŭi MšcÄvZ GB msL`v Avrvti Avrvv`b Kti hv cvl qv hv`Q Zv nj –

9. ssac, S and Michael, W.B. Handbook in Research and Evaluation (R.R. Knapp California, 1971)

GB cvtV Avgiv Z\_` ti dvti`ys tKšj vKlv g Ges t`Ljvg gva`vgK Z\_` vKfvte msMh KiZ nq| WKzgU vekt`Y KvR MtelK vK aitbi c`ŭc MhY Kiteb tm m`tU vKQy`K vbt` Rbv cvl qv tmj | cvtvi tkl chŭq WKzgU vekt`tYi m`eavmgn` vPvYZ Kiv ntqtQ| Avtiv itqtQ Z\_` cÄv vj vce`x Kivi AvšR`vZK vbgg|



**cvtVvEi gj`vqb - 6**

- **msvŭB DĖi cĕæ**
  1. gva`vgK Zt`i cŭqvRt`b GKRB Mtel K vKtmi gva`tg Avrvv`b KvR Pvj vteb?
  2. evsj v`tki vKŭv Mtel Yv msvvš`Z\_` tkvb tkvb `vtb cvl qv m`æ?
  3. WKzgU vekt`Y GKRB Mtel KtK Mtel Yvi KvR vKfvte mrvh` Kti?
  4. WKzgU vekt`tYi m`eav vK vK?

**cW 7**

**MtelYv m` f©KwVtgv I cÖZKiY**

**Dfík**

GB cW tkfI Avcb —

- ◆ MtelYv m` f©ÖZ Kivi ḡKZ.KvVtgv eYÖv KiZ cvi teb Ges
- ◆ bgby MtelYv m` f© gva`tg ḡZwi i ubqg ḡPryZ KiZ cvi teb|

th tKvb KvRi cwiKíbv chq, cÖWZ ce©BZ`w i b`vq Dc`vcb chq AZ`šl  
 , iazcY© MtelYv KvR Kivi cte©thgb tcÖcivRij wj LtZ nq, KvRi mgq tbvUeK  
 ubqgZ wj LtZ nq wK tZgub KvRwU tkl nq tMj m` f© wj tcvU, ḡ mxm AvKvfi  
 wj tL Zv gj`vqb KZE`fi KvQ gj`vqb KvRi Rb` Dc`vcb KiZ nq|

Povš wj Lb AZ`šl , iazcY©Ges gj`evb etj B effective essay writing, effective  
 scientific writing Gi gZ KvRi fite ḡ mxm wj Ltbi tKškj AvqE KiZ nq| ḡ mxm  
 ev Povš wj tcvU© KZK, wj AvšRmZKfite ḡKZ.KvVtgv AvQ| Avevi AtbK mgq  
 wekte`vj q KZE`fi, A`cÖvbKvix ms`v, MtelYv cwiPj b ms`v ḡR`^GKuU wefkI  
 KvVtgv Abgyfi KvRwU Kivi wbt`R t`b|

Avgiv GB cvfV cÖwj Z GKwU KvVtgv i iazcY©Ask, tjv mbr<sup>3</sup> Kie|

mvavi YZ GKwU MtelYv m` f©bgwj ḡLZ Ask, wj ḡKte —

- wktivbvq weewZ (title statement)
- thšw<sup>3</sup>KZv (rationale)
- MtelYvi Dfík (objectives of the study)
- AbggZ ḡm×všl (hypothesis)
- MtelYvi mxgve×Zv (limitation)
- MtelYv KvVtgv DchY Zv (suitability of the structure)
- mgMÖI tfšMwj K AĀtj i eYÖv (dification of the target area)
- Taw ubqšy tKškj I DcKiY (techniques and tools of identifying error)
- wbfPthvM`Zv I h`v`Zv mḡúwKZ weewZ (statement about reliability and validity)

wekte`vj q ev D`P wKfiv cÖZövtbi Avl Zvq th mg`l ḡMögyx MtelYv KvR nq Zvi  
 Rb` KZE`fi wK bmw AbgyiY Ki teb Zvi cÖZKZ.Ööubqgvej xÖ (regulation) KZE`fi  
 `Zix I Abgyv bceR MtelKt i wKwU cÖvb Ktib| MtelK/MtelK `j GB ubqgi  
 Avl Zvq MtelYv KvR Ktib I ḡ mxm `Zix Kti cixfjYi Rb` h`vh` KZE`fi wKwU  
 Rgv t`b|

**D`niY**

Avŷiv KŷqKŷU wekŷe`ij tŷi ŷGBPŷW MŷelYvi ŷbqŷej x t\_ŷK `ŷ GKŷU Ask t`Le|

fviŷZi gnviRv mŷvRivi wekŷe`ij q (eŷiv`v) Gi ŷGBPŷW ti ,tj kŷb ŷbaŷfc Dŷj L iŷqŷQ –

“The related subjects shall be decided by the Board of Studies concerned and shall be got approved by the PG Council and the syndicate”. “Each candidate shall submit four type-written printed copies of the thesis embodying the results of his research. The thesis shall contain an account of the research work carried out by the candidate leading to the discovery of new facts or technique or new correlations of scientific facts already known, . . . . .”

[gŷ- e<sup>3</sup>e: teŷW<sup>®</sup>Ae ÷ŷWR ŷelqe` ŷbaŷY Kŷib, ŷcŷR KvDŷYj cŷŷvRbŷq Abŷŷv`b cŷvb Kŷi| cŷZ`K cŷŷK Pvi Kŷc UvBc Kiv ŷŷmm Rŷv ŷŷZ nŷe| ŷŷmŷm Mŷel Yv KŷŷRi eYŷv ŷKŷe| MŷelK bZb ŷK mZ` ev tKŷKj Aŷe<sup>®</sup>vi KŷiŷQb Zv ŷj ŷce x Kiŷeb|]

Avŷŷvi Kvi nvl qvB ivŷR`i Pacific Western University Gi mŷZŷKŷEi chŷŷqi ŷŷmŷm I cŷR± mŷŷŷ ŷbaŷfc ŷbŷ`R iŷqŷQ –

“. . . . . It is important to recognise first of all that a project relies upon graduate level skills of marshaling sophisticated information within the context of the candidate’s professional environment . . . . . a Project will have a clearly defined objective. . . . . Its basic structure is in three parts : an Introduction, a Method and an Implementation.”

Aŷ÷ŷj qvi KŷUŷ BDŷbFŷmŷŷ Ae tUKŷbij ŷR Gi doctoral ŷŷŷŷ ŷbqŷej xZ referencng mŷŷŷ ŷbŷŷfc Dŷj L iŷqŷQ –

“the sources from which the student’s information is derived, the extent to which the work of others has been used. . . . . , shall be acknowledged generally in a preface or introduction and specifically in notes, references and appendices.”

Gi Kg ŷKQŷeŷkl ŷbqŷ mg x bŷmZŷvj v me wekŷe`ij tŷi AvŷQ|

**ŷj Lb ÷vBj**

ŷŷmŷm ŷj Lvi mgq th ÷vBj mŷavi YZ Abŷŷi Y Kiv nŷ Zŷvj The Chicago Manual of Style, GBŷU ŷKŷŷŷŷ wekŷe`ij q KZŷ.cŷZ eQi cŷKŷv Kiv nŷ|

cŷZŷU cŷZŷŷZ wekŷe`ij q, D`P ŷKŷŷv cŷZŷvb Ges MŷelYvi ms`v AvŷŷRŷZK ŷbqŷbŷmZi mŷŷ ŷbR`^ŷKQŷŷbq mŷŷŷ Kŷi MŷelYv KivR ev ŷŷmŷm cŷŷqŷ mŷŷŷŷ GKŷU AvŷŷRŷZKŷŷe`ŷKZ.bŷmZŷvj v e`envi Kŷi|



**cŷŷŷEi gj`ŷqŷ- 7**

- mŷŷŷŷ DŷEi cŷŷæ

1. Mŷel Yv m`ŷŷŷŷŷ YZ tKŷb Ask ,tj v ŷŷK?
2. Mŷel Yv m`ŷŷŷŷ Lb ÷vBj , iŷZŷŷŷŷKŷ?

**fiğKv**

eZ9ıvb c0ZıthvıMzigj-K mf`Zıvq th tKvb aiıfıbi MıtelıYv, `eÁvıBK cıxıfıv-ıbıxıfıv KıfıR cwi msL`ıfıbi avi Yv, mF e`vcK nıfı e`eüZ nıf`Q|

Ávb-ıeÁvıfıbi Ab`ıv` kvLvi gZ ıfıfıv I gıfıvıeÁvıfıbi ıefıfıbeıfıfıı cwi msL`ıfıbi e`envi Acıııvıh` nıfı tMıfıQ| cwi msL`ıv c xııZ e`envi Kivi dıfı ıfıfıv I gıfıvıeÁvıfıbi ıefıfıbeıfıvı KıR `beıfı3K I ıeÁvı ıfııfı3Kfıfıe Kiv mıe| thıfıZz cwi msL`ıv GKB mıfı2 cıxıfıvıgıj-K I cıııMıgıj-K ıeÁvı ZıB ıfıfıv mııüxıq MıtelıYv KıfıR Gi cııııM AZ`sıdıj cıııfı

Avıgıv GB BDıbıfııııı ıefıfıfıbeıfıv üüıfıfıv MıtelıYvüü KıR cwi Pıj bııııı ıefıfıfıbeıfıfıııı th mg`ı cwi msL`ıvııfıfııEK ıııfııe Kivi cııııRb nıq Zıvı ga` t`ıfıK Dıfıııııııı KıfıKııııııı e`envi ıfıLe|

- cıV - 1 mstık- 1  
 cıV - 2 mstık- 1vı4  
 cıV - 3 mstık- 1vı4 : ııaZı; mıgıvıxZıv I ıııYıfı  
 c xııZ  
 cıV - 4 mııııe x mstıkıvı4  
 cıV - 5 cıııııııK I AcıııııııK cwi msL`ıv : avi Yv  
 cıV - 6 KıB eMıııUııı  
 cıV - 7 z-ııUııı  
 cıV - 8 t-ııUııı

**cW 1**

**msfk**

**Dfik**

GB cW tkfI Avcib —

- ◆ msfk i msAv c0vb KiZ cvi teb;
- ◆ msfk avi YmU e`vL`v KiZ cvi teb Ges
- ◆ ci`ui m`uK<sup>9</sup> Pj tKi gta` m`utK<sup>9</sup> gvIv tei Kivi c0qvRbxqZv e`vL`v KiZ cvi teb|

uk<sup>9</sup> e`e`vi weifbaet<sup>9</sup> Avgiv mevB weifbaew`K ubtq KvR KiuQ| Avcbriv tKD tkYxK<sup>9</sup> uk<sup>9</sup> ubtq<sup>9</sup>RZ, tKD uk<sup>9</sup> c0vmtb KvR KiZQb| tKD Avevi uk<sup>9</sup> I civ`m<sup>9</sup> uba<sup>9</sup>Yi`vqZc0B, tKD ev cix<sup>9</sup> cwi Pij bv, civ`cyK c0vkbv I gy<sup>9</sup>Yi KvtR e`l i tq<sup>9</sup>Qb| uK<sup>9</sup> G mg`l tckvq ubtq<sup>9</sup>RZ c0Z`KtKB c0qk`<sup>9</sup> Pj tKi gta` we`gvb m`utK<sup>9</sup> c0k<sup>9</sup>. I gvIv ubY<sup>9</sup> KiZ nq|

thgb- c0<sup>9</sup>gK we`ij tqi uk<sup>9</sup> i`vqZi`v<sup>9</sup> uk<sup>9</sup> i eqtmi mvt` thb`<sup>9</sup> ev<sup>9</sup> nq tm<sup>9</sup> tK`<sup>9</sup> i vL<sup>9</sup>| Gt<sup>9</sup> c0Z<sup>9</sup> tkYxi c0Z<sup>9</sup> uk<sup>9</sup> eqm evovi mvt` mvt` k<sup>9</sup>ixK ev<sup>9</sup>l thb Avbg<sup>9</sup>ZK nvti nq tm Rb` eqm I D`PZvi ga`Kvi m`uK<sup>9</sup> tei Kiv Z<sup>9</sup> i`vqZi|

Avevi uk<sup>9</sup> <sup>9</sup>ubK mlyg Lv` MhY KiZ<sup>9</sup> uk<sup>9</sup> ev GtZ Zvi`<sup>9</sup> ev<sup>9</sup> Avbg<sup>9</sup>ZK nvti n<sup>9</sup> uk<sup>9</sup>, th uk<sup>9</sup> <sup>9</sup>M<sup>9</sup>YtZ fuj tm weAv<sup>9</sup> t<sup>9</sup> uk<sup>9</sup>, th eisjv e`vKi<sup>9</sup> <sup>9</sup> tm uK Bst<sup>9</sup>R e`vKi<sup>9</sup> <sup>9</sup> G mg`l<sup>9</sup> tK tLqj i<sup>9</sup> tLb gva<sup>9</sup>gK ch<sup>9</sup>qi tkYx uk<sup>9</sup> Ges we<sup>9</sup>l q uk<sup>9</sup>|

uK Kti tei Kiv nq Gme m`uK<sup>9</sup>

msw- o Z` msMh Kti, we<sup>9</sup>kd<sup>9</sup>Yi gva<sup>9</sup>g AvMh<sup>9</sup> e`<sup>9</sup> ev MtelK tei Ktib`<sup>9</sup> m`uK<sup>9</sup> Pj tKi ga`Kvi m`utK<sup>9</sup> gvIv|

h<sup>9</sup> <sup>9</sup> Pj K Gifc nq th GK<sup>9</sup>U<sup>9</sup> gvb cwi eZ<sup>9</sup> Ab<sup>9</sup>U<sup>9</sup> gvb cwi e<sup>9</sup>Z<sup>9</sup> nq (evto ev Ktg) Zte GB`<sup>9</sup> Pj KtK ci`ui m`uK<sup>9</sup> ev correlated ej<sup>9</sup> nq|

msfk nj`<sup>9</sup> ev ZtZwaK Pj tKi gta` mnMgtbi c0YZv|





**msfk- I v¼**

**Dfik`**

GB civ tkfI Avciub —

- ◆ msfkdv¼ msÁvqZ KiþZ cviþeb;
- ◆ weifbagvÍvi msfkdv¼i aviYv e`vL`v KiþZ cviþeb Ges
- ◆ weifbagvÍvi msfkdv¼ wPÍvqZ KiþZ cviþeb|

Avgiv cŭg cvtV tRþbW mskd` wK Ges tKvb aiþbi Pj þKi gta` mskd` \_vKvi mætebv AvtQ Zv cvtVi tkfI mbr³ KiþZ m¶g nþquQ|

eZgub cvtV Avgiv `Bw mæúK¶y Pj þKi ga`Kvi mæúK¶ gŭv tei Kie|

th cwimsL`vbMZ parameter, mPK ev ciwguZi mrvth` `Bw mæúK¶y Pj þKi ga`Kvi mæúK¶L`R tei Kiv nq ZvþK etj mskd`v¼ ev `Yv¼ ev coefficient of correlation (r)|

Avgiv hw` mskd`þK ewj 00` Bw ci`úi mæúK¶y Pj þKi gta` mnMgþbi cEYZvŭ Zvntj Avgiv mnþRB eSþZ civuQ th GB mnMgb tgvUvgnw wZb aiþbi ntZ cvti

- GKwJi ewx`i mvt`\_ AciwJi ewx` A\_ev GKwJi nrtmi mvt`\_ AciwJi I nwm
- GKwJi ewx`i mvt`\_ AciwJi nwm
- GKwJi ewx` ev nrtmi mvt`\_ Ab`wJi tKvb ewn`K mæúK¶bv \_vKv|

Dctii wZb cKvtii gta` cŭguþK ejv nte avvZþK mskd`| wZxquw nte FYvZþK Ges ZZxq t¶¶t` tKvb mæúK¶bvB, A\_¶ r = 0|

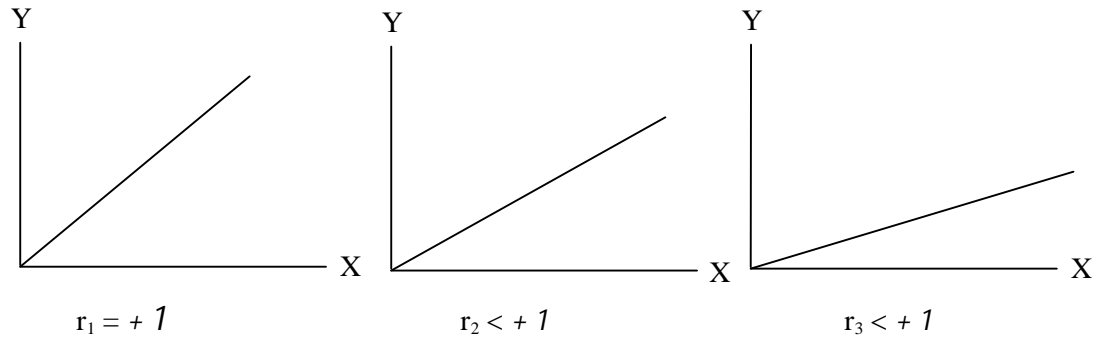
`Bw mæúK¶y Pj þKi Dftqi cwieZB mggylx (GKwJi ewx`þZ AciwJi ewx`, GKwJi nwm ntj Ab`wJi I nwm cvl qv) ntj r avvZþK nte| Gi mtePP gŭv nte + 1|

thgb- mæúZ CAMPE (Campaign for Popular Education) GK MfelYv cKvkbvi (Education Watch 1999) gva`tg RvnbþtqQ th, AmgeavMŭ` cwi evti cŭwgK wK¶v we`þti wZvgnvZvi AskMhY, weþkl Kþi gvtqt`i fvgKv AZ`šimvqK|

A\_¶ Avgiv ejþZ cwii, cŭwgK wK¶vq wK¶v\_¶weÜb msL`v ewx`i mvt`\_ mšþbi gvtqi avvZþK AskMhþYi mæúK¶mggylx I D`PMgx (r avvZþK)| [Drm: The Daily Star 26þk AvM÷ 099 ct, 1 I 11]

ᄡ Ae GWKKb

ᄡᄡ Pj ᄡKi gaᄡKvi abvZKK mᄡúKᄡ (ᄡg nᄡmgvb) ᄡᄡᄡ mᄡr ᄡbgie/c nᄡe:

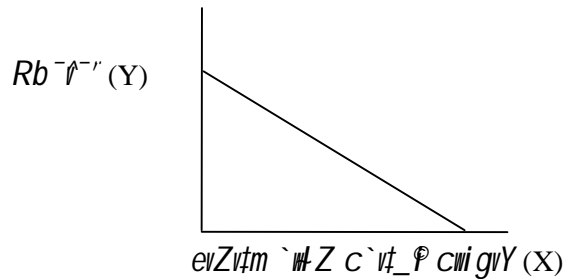


ᄡᄡ 5-2.1

Dᄡᄡi ᄡᄡ ᄡZᄡᄡᄡ x Gi ᄡvb ᄡᄡᄡ cvl qvi mᄡᄡ ᄡfbᄡᄡᄡᄡᄡᄡ y Gi ᄡvb ᄡᄡᄡ cvᄡᄡQ|

cᄡᄡᄡᄡ x Ges y mᄡᄡᄡi evotQ A\_ᄡ GLvᄡb r Gi ᄡvb +1| ᄡZᄡᄡᄡᄡ x Gi ᄡᄡᄡ y Gi ᄡᄡᄡ teᄡᄡ; mᄡᄡᄡ r Gi ᄡvb +1 Gi ᄡᄡᄡ Kg| ZZᄡᄡ ᄡᄡᄡ x Gi ᄡᄡᄡi Zᄡᄡᄡ y Gi ᄡᄡᄡ AZᄡᄡᄡᄡ|

tKvb ᄡᄡ Pj ᄡKi (mᄡúKᄡᄡ) GKᄡᄡi cᄡieZᄡ ᄡᄡ Acᄡᄡi ᄡecᄡᄡᄡᄡ cᄡieZᄡ NUᄡᄡ Zᄡᄡᄡ GB cᄡieZᄡᄡᄡ Avᄡᄡ ᄡᄡZeiPK ev FYᄡᄡK mᄡᄡᄡ ᄡᄡᄡ cᄡᄡᄡ Kie| ᄡᄡᄡ evZᄡᄡ ᄡᄡZ cᄡᄡᄡ cᄡᄡᄡ evotj Rbᄡᄡᄡi Aebᄡᄡ NUᄡe; Gᄡᄡᄡᄡ r Gi ᄡᄡᄡ nᄡe FYᄡᄡK|



ᄡᄡ 5-2.2

FYᄡᄡK mᄡᄡᄡᄡᄡi Avᄡᄡi Kᄡᄡ Dᄡᄡᄡᄡ nᄡZ cvᄡᄡ –

bvix ᄡᄡᄡᄡ nvi evotj Aᄡᄡᄡᄡᄡᄡ ᄡᄡᄡ nvi Kgᄡe|

G mᄡᄡᄡᄡᄡ GKᄡᄡ Pj ᄡKi ᄡvb evotj mᄡúKᄡᄡ Abᄡᄡi ᄡvb Kᄡᄡ ᄡᄡᄡ; A\_ᄡ GKᄡᄡi cᄡieZᄡ Abᄡᄡi ᄡecᄡᄡᄡᄡ cᄡieZᄡ NUᄡᄡᄡ|

tbwZeiPK mstk- #li t`j`T r Gi mteP gvb nte -1| A\_`P` BwU Pj`Ki gta` r =  
-1 nte hwr GB` BwU tKvbiUB Ab` tKvb eint ciwgvZ Øviv cFimeZ br nq Zte  
Gt`i ga`Kvi m`úK`nte cY`FYvZK|

`BwU Pj`Ki ga`Kvi FYvZK m`úK`e`vL`vKvix`P` 3-2.2 Gi Abjyc nte|



## civVÉi gj`vqb- 2

- msw`jB DÈi cKae

1. mstk`v`ej tZ`wK`teivSq?
2. mstk`v`i cKvi`f`ij Lly|
3. 00mstk`v`i gv`v +1 nZ`-1 chS00 GB avi YvU e`vL`v Kiab|

**cw 3**

**mstkd v¼ : iaz; mrgve xZv l wYq c xwZ**

**Dfík**

GB cw tkfl Avcb —

- ◆ mstkd v¼ i iaz; e vL v Ki tZ cvi teb;
- ◆ mstkd v¼ e envi i mrgve xZv wPwYz Ki tZ cvi teb Ges
- ◆ mstkd v¼ wYq c xwZ e envi Ki tZ cvi teb |

cġg `Bw cwV Avgiv mstkd m tU cġwgK avi Yv jvf Kiv mn mstkd v¼ i newfbzV cġ`q KtiwQ |

GB cwV Avgiv mstkd v¼ i iaz; tRtb mstK- l v¼ wYq i KtqKw mF cġqM Kiv wkLe |

ev`e Rxe tb newfbetckvq wbtqmwRZ e w<sup>3</sup> Ggb Ae`vi m w<sup>3</sup> nb hLb Zv tK `B ev ZtZwAK Pj tKi cri`úw K m w<sup>3</sup> K<sup>3</sup> fei Ki tZ nq |

wkqV e`e`vq wbtqmwRZ newfbæ`w<sup>3</sup> e tM<sup>3</sup> newfbæ i tbi dj v dtj i KvhRvi Y wPvi Kivi Rb` mstkd v¼ w tme Ki tZ nq |

ev`é t q tġ mstkd v¼ w tme Kivi cġqRbxqZv Ab`xKvh<sup>3</sup> D`vni Y` tjc ejv hvg, 1999 mtj i AvM ÷ gvtm Letii KvM tR t`Lv tMj K tmtfv AA tġ kwš l i qvi Rb` RmZmsN th kwš é wnbx tgv Zvtqb KtiwQj tmLv tb evj vt`k cġ k ewnbx t` tK tgvU EbcÁvk Rb cġ k Avdmvi cvVt bv ntq wQj | GB kwš l wgtb hvevi A tM Zviv t` tK BstiwR fv lvi` qZv w el t q cix qV w t q DĒX Y<sup>3</sup> ntq wQj b | wKŠ` tLRbK ntj l mZ` th, K tmtfv AA tġ t cġQ Zviv Avevi hLb cix qV w t j b ZLb Zv t` i gta` Qwġ k RbB DĒX Y<sup>3</sup> tZ cvi t j b bv |

Avgiv ej tZ cwii GB `Bw cix qvi dj v dtj i gta` mgZv tbB etj B GB Qwġ k Rb tK e`\_ g t bvi \_ ntq t` tK w dti Avm tZ nj | [Drm: The Daily Star m w<sup>3</sup> Kix 14 AvM ÷ 099] A\_ w th me e w<sup>3</sup> t` tK cix qVq fvj dj KtiwQj b Zviv mevB K tmtfv wM t q GKB cġ wZi cix qVq fvj Ki tZ cġ t b bv B | Avgiv ej tZ cwii bv th evj vt` tki cix qVq fvj K t j B K tmtfv i cix qVq l fvj Kiv m w<sup>3</sup> ntq wQj |

1994 mvtj i BDwbmtdi 00t`kmgfni AMWZ00 c0Zte`tb t`Lv hv`Q, evsj v`tk 1992 mvtj

WRGbw	5 eQti i Kgeqmx iki gZzi nvi			cAg tkYx chS tclvrbv iki t`i %		
220	cKZ	cL`mkZ	cv`R`	cKZ	cL`mkZ	cv`R`
	127	168	+ 41	46	35	+11

(127) cteRvi ti KW Abjvni th msL`v aji tbqv ntqij (168) Zvi tPtq Kg/ GBW GKW Avkve`AK Z`\_| Avgiv ej tZ cmi GB tPtq cKZ. I cL`mkZ msL`vi gta` FYvZK m`uK` Avgv`i t`tki Rb` AZ`slmlyei |

WK GKBfite ej v hvq,

Unicef th cmi msL`wfiEK Z` cKvk KitiQ Zvi gva`tg t`Lv hv`Q trend Abjvqx 1992 mvtj we`ij tq cAg tkYx chS th mg`luki covi bv Pwj tq hvq Zv`i kZKiv nvi gvT 35 nl qvi K\_v wQj WKŠ`cKZctqj c0`ugK ukqvi c0Z gv-eiev Awf fve tKi mtPZbZv teto tMtQ, cmi tek Abkj ntqtQ, c0`ugK ukqvi mshwM mjeav ewx Kiv ntqtQ etj B cKZctqj c0Z 100 R`bi gta` 46 Rb iki cAg tkYx chS covi bv KitiQ| GLv`b cL`mkZ (35) Ges cKZ. msL`v (46) GB `BwJi gta` cv`R` 46 - 35 = + 11 Avgv`i Rb` Akven |

Gevi Avgiv iki gZzi nvi I cAg tkYx chS tclvrbv iki i cKZ. msL`v ch`ej vPbv Kiti ej tZ cmi iki gZzi nvi Ktg hv l qvi mvt\_ mvt\_ iki c0`ugK ukqvi nvi ewx tctqtQ| GLv`b evn`Z GKW FYvZK m`uK` t`Lv hv`Q; Aek` GtPtq GB FYvZK m`uK` Avgv`i Kvg` |

Avgiv Dctiv<sup>3</sup> Z` t`tk t`L tZ cwr`Q-

- WRGbw ewx i mt½ c0B eQti i Kgeqmx iki gZzi nvi FYvZK
- WRGbw ewx i mvt\_ cAg tkYx chS tclvrbv iki t`i kZKiv nvi avvZK |

Dcti i KtqKw D`vni Y t`tk Avgiv eStZ cvijvg RbRxe tbi tPtq m`uK` `Bw Pj tKi gta` m`uK` L`R tei Kivi ht\_ó c0qvRb itqtQ |

gtb ivL tZ nte -

**mvgie x Zv**

- `Bw m`uK` Pj tKi gta` mstkd cmi j wqZ ntj B wvDZ ntq ej v hvtebv th, Gt`i gta` miz`Kvi At\_ m`uK` itqtQ |
- mstkd v¼ we tkd Y Kivi dtj Avgiv i agvT GB `Bw Pj tKi ga`Kvi mnMgb m`uK` avi Yv cvB WKŠ` cmi eZ tbi tKvb Kvi Y m`uK` Z` cvB bv |

Ge GWKkb

- MmYwZK cLuvq cÖB`Bw Pj tKi gta` mstkdv¼ me`gvb\_vKtj l tKvb tKvb t¶t¶ t`Lv hvq th, Gt`i gta` cKZ.tKvb mnmúK®tbB| A\_® wntme Kti th msL`v cvl qv hvq Zv memgq cKZ.¶P¶ ifcwqZ Kti bv|

Gevi Avgiv wby® cxwZ wkLe|

`Bw múK®y Pj tKi ga`Kvi mútkP gv¶v tei Kivi Rb` mvariYZ Kyj® wcvimtbi mF-B e`eüZ nq| GB mFw wbgie/c -

$$r = \frac{N \sum XY - (\sum X)(\sum Y)}{\sqrt{[N \sum X^2 - (\sum X)^2][N \sum Y^2 - (\sum Y)^2]}}^{1/2} \quad (m\hat{F} 5-3.1)$$

**D`niY**

gtb Kiab, GK eB wettzv`BRb weL`vZ tj Ltki`Bw eB-Gi wettqi gta` tKvb múK®AvtQ wKbv Zv tei Kitz Pvb| wZwb`k w`tb GB`B e`w³i eB`Bw th msL`vq we¶v ntqtQ Zvi GKw Zvwj Kv cÖZ Kti tQb| Zvwj KwU wbgie/c -

w b	we¶vZ eB-Gi msL`v	
	tj LK ÖKl	tj LK ÖLl
1	13	7
2	12	11
3	10	3
4	8	7
5	7	2
6	6	12
7	6	6
8	4	2
9	3	9
10	1	6

t`vKv¶bi gvij K wbtPi gvb,tjv wntme Kti tei Kiteb|

$\sum XY$

$\sum X^2$

$\sum Y^2$

wbtPi mvi Yxi (5.3-1) gta` wZwb gvb,tjv emvtj b -

X	Y	XY	X <sup>2</sup>	Y <sup>2</sup>
13	7	91	169	49
12	11	132	144	121
10	3	30	100	9
8	7	58	64	49

7	2	14	49	4
6	12	72	36	144
6	6	36	36	36
4	2	8	16	4
3	9	27	9	81
1	6	6	1	36
70	65	472	124	533

Ճշգրտված միջինների և արտաքին տեղի կետեր

$$r_{XY} = \frac{[N \sum XY - (\sum X)(\sum Y)]^2}{[N \sum X^2 - (\sum X)^2][N \sum Y^2 - (\sum Y)^2]}$$

$$= \frac{[10 \times 472 - 70 \times 65]^2}{[10 \times 624 - (70)^2][10 \times 533 - (65)^2]}$$

$$= \frac{(170)^2}{(1340)(1105)} = \frac{28900}{1480700} = 0.0195$$

$$r_{XY} = (0.0195)^{1/2} = + 0.14$$

Ճշգրտված տեղի կետերի և ճշգրտված միջինների միջև գտնվող հարաբերակարգի արժեքը 0.14 է, որը ցույց է տալիս, որ ճշգրտված միջինների և արտաքին տեղի կետերի միջև կա ցածր կոորդինացիոն կապ:

Ճշգրտված միջինների և արտաքին տեղի կետերի միջև կա ցածր կոորդինացիոն կապ, որը ցույց է տալիս, որ ճշգրտված միջինների և արտաքին տեղի կետերի միջև կա ցածր կոորդինացիոն կապ:

Արդյունքում Այս հարաբերակարգը ցույց է տալիս, որ ճշգրտված միջինների և արտաքին տեղի կետերի միջև կա ցածր կոորդինացիոն կապ:

Ճշգրտված միջինների և արտաքին տեղի կետերի միջև կա ցածր կոորդինացիոն կապ, որը ցույց է տալիս, որ ճշգրտված միջինների և արտաքին տեղի կետերի միջև կա ցածր կոորդինացիոն կապ:

Կետ	ԴՊՅ	ԻՐԵ
K	31	17
L	27	18
M	29	16
N	31	22
O	32	22
	<b>30</b>	<b>19</b>



Geçirgenin Gözlemleri

Gözetilen Öğrencilerin Yaşları

Gözetilen Öğrencilerin Sıralama Puanları

	x	y
K	1	-2
L	-3	-1
M	-1	-3
N	1	3
O	2	3

Gözetilen Öğrencilerin Yaşlarının Karesi ve Sıralama Puanlarının Karesi

	xy	x <sup>2</sup>	y <sup>2</sup>
K	-2	1	4
L	3	9	1
M	3	1	9
N	3	1	9
O	6	4	9

Gözetilen Öğrencilerin Yaşları ile Sıralama Puanları Arasındaki İlişkinin Ölçülmesi

$$r = \frac{\sum xy}{\sqrt{\sum x^2 \cdot \sum y^2}}$$

$$= \frac{13}{\sqrt{16 \cdot 32}} = \frac{13}{22.6} = 0.57$$

Gözetilen Öğrencilerin Yaşları ile Sıralama Puanları Arasındaki İlişkinin Ölçülmesi



### cvfVvEi gj`iqb- 3

• **mgm`vgj-K ckae**

1. mstkdv¼ r wntme Kivi gva`tg mn-mauKfjy `Bw Pj tKi wK ai#bi mauK#ei Kiv mae?
2. `kg tkYxi gwmK cixflvq wbtgwe³ `kRb meflcflv `gfl wKflv\_#MwYZ I c`v\_© weAvtb wbgie#c baf tctqtQ| Avrcwb t`Ltz AvMbx 00hvin MwYZ `gfl Zviv mwaviYZ c`v\_©weAvtbl `gfl00 GB cca` GLv#b KvhRi wKbv| MwYZ I c`v\_© weAvtbi baf#i gta` mstkdv¼ tei Kiab|

		wKflv_# tij baf									
		11	13	27	39	40	46	51	53	57	59
c03	MwYZ (x)	5	3	6	8	4	10	18	12	7	19
baf	c`v_©y)	8	10	4	7	17	12	10	11	9	18

**MwYZK mgvaib**

$$r = \frac{\sum(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum(x_i - \bar{x})^2 \sum(y_i - \bar{y})^2}} \quad |m\hat{I} 5-3.1 \text{ Ges eZgwbw GKB hwi l eZgwb mgavtb Avgiv } \bar{x}, \bar{y} \text{ e`envi KiwQ|}$$

ati tbB  $(x - \bar{x}) = x$  Ges  $(y - \bar{y}) = y$

wntme Kijtj cvl qv hvte,  $\sum(x_i - \bar{x})(y_i - \bar{y}) = \sum xy = 103.72$

Ges  $\sum(x_i - \bar{x})^2 = 281.60$

$\sum(y_i - \bar{y})^2 = 164.4$

Ges  $\sum(x_i - \bar{x})^2 (y_i - \bar{y})^2 = 281.60 \times 164.4 = 46295.04$

$r = \frac{103.72}{\sqrt{46295.04}} = \frac{103.72}{215.16} = .48$

Avrcwb ati wbtz cvtib GB `kRb wKflv\_#AstK `gfl etj c`v\_©weAvtb wettql `gfl00 GB cca` tgvUvgw mZ" (AšZ GB we#kl cixflvi tfl#t)|

**civ 4**

**mwi ex mstkdv¼**

**Dfík**

GB civ tkfI Avcwb —

- ◆ mn-múKñy Pjtki MwywZK gvb e'envi e'wZtítK wK tkŠktj mstkdv¼ tei Kiv mæ Zv e'vL'v KitZ cvi teb|
- ◆ p ev mwi ex mstkdv¼ tei KitZ cvi teb Ges
- ◆ p Gi mxiexZv wPwýZ KitZ cvi teb|

wKñv tñtî AfbK mgqB wKñKtK Zwi wKñv\_ñ eyx, mZZv, AbjwM, AvMñ ubtq KivR KitZ nq| wKŠ' G mg'í 'enkó' mbv³ Kivi tñtî cixñv MñY Kti cixñvq baf t' lqv Lg Kw/b| Zte wKñK wKfvte wKñv\_ñ AMñwZ j ñ' Kiteb?

th mg'íPjtki miwmi gvb t' lqv mæ nt'Q bv, wKñK GB cKwzi `ñw múKñy Pjtki cvi `úwi K mútKp giv tei KitZ PvBtj mwi ex mstkd- l ev i'vsK-mú cxiZ cñqvM Kiteb|

Avgiv ejtZ cwii, 00th mg'íPj KtK mjbw' ð mSL'wK Ae'vq cKvK Kiv hvq bv wKŠ' tkYx ev csw³ (ranking) Kiv mæ tm me tñtî mwi ex mstkdv¼ (p) wntme Kti tei KitZ nq|

**KihexwZ**

gfb Kiab, Avcwb wKñv\_ñ tgav, wPññYZv, e'envi K KvRi `ñZv Gme ubtq KivR KtitQb| G mg'í, Yvejtk e'w³ wtktli tñtî tkYxKiY Kiab| A\_ñ

- Avcwb 1, 2, 3 BZ'w` AbywngK mSL'v e'envi Kti c`mgfni wfwÉµg ev rank w'í Kiab|
- `ñw múKñy Pjtki cñZ'KwU ct'i wv'ð 'enkó'i mitctñ µg Ablyqx `ñw Ae'vb civl qv hvte|
- Ppovšlchñq µg Ablyqx Ae'vbi `ñw tkYx cñZ Kiab|
- Gevi Spearman's rank correlation coefficient Gi mñ e'envi Kti Avcbvi wPwýZ PjK `ñwi gta' Dcw'Z mæ' mútKp gvb (p) tei Kiab|

**p Gi mñ**

$$\rho = 1 - \frac{6 \sum d^2}{N(N^2 - 1)} \quad \text{mgiKiY (5-4.1)}$$

GLvfb,  $\rho =$  , YvbywngK mstkdv¼ (ev mwi ex)

Gg GW tcnñg

$N = MYmsL\bar{v}$   
 $d = c\bar{Z} tRvov \mu\bar{g}K b\bar{a}i i g\bar{a}'' c\bar{v}_R''$

Avmky, ev`e D`vni tYi mivith'' GB mHUU ejs tbB -

1998 uk`vve t`ei Dveoi` q Ae GWKkb Gi weGW tcMAtg tKvb GKUU ÷vWV tm>Uv ti uk`v vbmZ cwi i PivZ I gtbve Avb cwi i PivZ tKvm` Bui uDUi uk`v\_ i GB tKvm`B` Bui Kv tRi mveavi Rb'' GB` B uDUi gvI` kRb uk`v\_ tetQ vb tjb | GKUU BDvb tUi Dci tgSLK ckK i tjb | cti vZvb uk`v\_ i tevaMg Zv tK vb gteftc mu gK b a t i t j b -

uk`v vbmZ cwi i PivZ	gtbve Avb cwi i PivZ
7	6
6	6
3	5
8	7
2	5
6	3
7	9
7	4
10	7
4	8

GB` B uDUi t`L tZ Piv`Ob uk`v\_ GB` Bui tKvm`B-Gi` Bui avi Yv m a t U th e`vL`v i` t`Q Zvi gta'' tKvb Av s t m a u K` Av t Q uk`v |

ranking Kivi mgq GB` B uDUi gv b\_ t j vi Av t c i t K f t i i K\_ v g t b i v L t j b | d t j G t` i ranking mvi YmU vb t Pi gZ n t e |

t i v l s t` j		i` i s i k s t` j		d <sup>2</sup>
uk`v vbmZ	uk`v gtbve Avb			
7	6	7	5.50	2.25
6	6	4.50	5.50	1.00
3	5	2	3.50	2.25
8	7	9	7.50	2.25
2	5	1	3.50	6.25
6	3	4.50	1	12.25
7	9	7	10	9.00
7	4	7	2	20.00
10	7	10	7.5	6.25
4	8	3	9	36.00

$\sum d^2 = 102.50$

$\bar{d} = Ae$  GWKKb

$d^2 = Gi A_{hj} c_{Z} tRvor \mu_{gK} b_{\text{ti}} i \text{ gta}'' c_{v\_R}''$

GLvfb,  $\sum d^2 = 102.50$ ,  $N = 10$

$\hat{m} 5-4.1 G \sum d^2 Ges N Gi gvb emvB$

$$\therefore \rho = 1 - \frac{6 \sum d^2}{N^3 - N} = 1 - \frac{6 \times 102.50}{10^3 - 10}$$

$$= 0.379 = 0.38$$

Dctiv<sup>3</sup> `BvU tKvmp UDUi t`Ltb th, ukv<sub>v</sub> i tevaMgZvi th i`vsuKs Kti tQ Zvi gta` tgvUvgy GK abvZK mn-m<sup>u</sup>K<sup>o</sup> tqtQ

huiv ukv<sub>v</sub> m<sup>u</sup>K<sup>o</sup> vclq vbtq tQvU LvU Mtel Yv Kitz Pvb Zuiv GKUztPon Kitz B Gi Kg AfbK vclq cvfeb thLvfb Pj tki gta` i`vsuKs m<sup>u</sup>K<sup>o</sup> mn-m<sup>u</sup>K<sup>o</sup> tei Kti vck- IY Kiv hvq

**mvgv<sup>x</sup>Zv**

Spearman's rank correlation  $\rho$  Gi mKQymvgv<sup>x</sup>Zv i tqtQ | G<sub>v</sub> t<sub>v</sub> n<sup>o</sup>Q-

- i agv<sup>l</sup> tkv<sup>x</sup> vPj K cvmsL<sup>v</sup> vev<sup>l</sup>bi t<sup>l</sup>t<sup>l</sup>  $\rho$  Gi gvb tei Kiv m<sup>o</sup>e |
- c`msL<sup>v</sup> vev<sup>l</sup> ev N>30 n<sup>o</sup>  $\rho$  Gi gvb vby<sup>o</sup> Kiv Kómv<sup>l</sup> |

gtb ivL<sup>eb</sup>,

- $\rho$  Gi gvb hv<sup>l</sup> +1 nq ZLb e<sup>l</sup>s vbtZ n<sup>o</sup> th, `BvU cvkvcv<sup>l</sup> m<sup>u</sup>v<sup>l</sup>  $\mu$ g Ablyvq<sup>x</sup> c<sup>l</sup>Z`K c<sup>l</sup> i Ae<sup>l</sup>vb GKB |
- $\rho$  Gi gvb hv<sup>l</sup> -1 nq ZLb `BvU m<sup>u</sup>v<sup>l</sup>  $\mu$ g Ablyvq<sup>x</sup> c<sup>l</sup>Z`K c<sup>l</sup> i Ae<sup>l</sup>vb vev<sup>l</sup>vZg<sup>l</sup> |
- $\rho$  vnt<sup>me</sup> Kti tei Kiv tgvUvgy mnR |
- , YevPK Z<sup>l</sup> i t<sup>l</sup>t<sup>l</sup>  $\mu$ g gv<sup>l</sup>v e<sup>l</sup>envi Kti mntRB  $\rho$  Gi gvb tei Kiv hvq |
- Z<sup>l</sup>  $\mu$ gvbvq<sup>x</sup> m<sup>u</sup>v<sup>l</sup>  $\times$  Ae<sup>l</sup>vq cvlqv t<sup>l</sup>t<sup>l</sup> GKgv<sup>l</sup> Spearman's rank correlation Gi gva<sup>l</sup>g m<sup>u</sup>tk<sup>l</sup> v<sup>l</sup> tei Kiv m<sup>o</sup>e |



### ciVvEi gj`vqb - 4

• msuB DEi ckae

1. ρ Gi MmYvZK mF`ij Lk Ges c` ,tj vi A\_ eYBv Kiab|
2. ρ Gi gvb + 1 ntj

Spearman-Gi mF`i Σd² Gi gvb KZ nte?

3. tKvb GKvU cvevj K cixvqv BstivR I eivsv mel tq 100 bafii `beq³K cixvqv 12 Rb cixvqv\_ p`btgme³ baf tctqtQ| kvqv\_ i GB `BvU mel tqi bafii ρ tei Kiab|

eivsv (x)	85	74	76	90	85	87	94	97	80	90	76	74
BstivR (y)	64	50	55	64	55	70	64	70	54	70	50	54

### 3. mgvab

$$\rho = 1 - \frac{6 \sum d^2}{N(N^2 - 1)}$$

X baf	Y baf	X Ae`vb	Y Ae`vb	d = X <sub>A</sub> - Y <sub>A</sub>	d²
85	64	6.5	5	1.5	2.25
74	50	11.5	11.5	0	0
76	55	9.5	7.5	2.0	4.00
90	64	3.5	5	-1.5	2.25
85	55	6.5	7.5	-1.0	1.00
87	70	5	2	3	9.00
94	64	2	5	-3	9.00
97	70	1	2	-1	1
80	54	8	9.5	-1.5	2.25
90	70	3.5	2	-1.5	2.25
76	50	9.5	11.5	1.5	4.00
74	54	11.5	9.5	-2.0	4.00
					Σd² = 41

$$\rho = 1 - \frac{6 \sum d^2}{N(N^2 - 1)} = 1 - \frac{6 \times 41}{12(144 - 1)} = 1 - \frac{246}{1716}$$

$$= 1 - 0.143 = 0.857$$

**ciV 5**

**ciVgwiK I AcivgwiK cwiMSL`vb : aviYv**

**Df`ik`**

GB ciV tkfI Avciwb —

- ◆ ciVgwiK tU÷ msÁvqZ KiZ cvi`teb;
- ◆ AcivgwiK tU÷ msÁvqZ KiZ cvi`teb;
- ◆ `B cKvi tU÷ i cv`R` ubt`R KiZ cvi`teb Ges
- ◆ ciVgwiK tU÷ i `enkó` wPwYZ KiZ cvi`teb|

wKqV tqf`I ubtqwiRZ MtelK` i ciVgwiK I AcivgwiK Dfq cKv`ii cwiMSL`v`bi ht\_ó e`envi KiZ nq| GB ciV Avgiv GB `B cKv`ii cwiMSL`vb e`envi msPvŠl wKQyAvtj vPbv Kie|

ciVgwiK tU÷ nj tm ai`bi tU÷ thLv`b MtelK th Z\_`iek! ev mgM`K nZ bglv Pqb K`ib Zvi g`a` G\_`tjvi c`viwvUvi ev gv`v m`fU` wKQymw`w` kZ`\_v`K| G mg`l`tg`ij K kZ`hLb c`Y Kiv m`e nq i`agv` ZLbB MtelK G ai`bi tU÷ e`envi KiZ cvi`b|

A\_`f` 00th ai`bi tU÷ Z\_`iek! ev mgM`K Gi parameter ev gv`v ev gvb m`fU` wKQy mw`w` kZ`\_v`K Zv` i ciVgwiK tU÷ etj |00

ciVgwiK tU÷ i D`niY nj , t, z Ges F tests |

Acic`q, AcivgwiK tU÷ nj tmme tU÷ hv`Z th Z\_`iek! ev mgM`K nZ bglv Pqb Kiv nq Zvi c`viwvUvi ev gv`v m`fU` tKvb mw`w` kZ`\_v`K bv| G ai`bi tU÷ e`Ubg` ev distribution free|  $\chi^2$  ev KvBeM`tU÷ nj AcivgwiK tU÷ i g`a` e`uj e`e`uZ GKw|

Avgiv cieZ`cW\_`tj v`Z G mg`l`tU÷ ubtq w`lwi Z Avtj vPbv cie| Geri t`L`y GB `B cKv`ii tU÷ i gj` cv`R`|

QK 5-5.1: civgvwĭK I AcivgvwĭK tU÷i cv\_Ŕ`mgn

<b>civgvwĭK</b>	<b>AcivgvwĭK</b>
<ul style="list-style-type: none"> <li>• th ıtekb nřZ bglyv mSMĥ Kiv nq Zvi cĶWZ. Rıbv _vKřZ nře </li> <li>• mgMĥKi gvĭv mřŦÜ KZ,ıj ıekl AbıgvıZ ev assumption _vřK </li> <li>• AcivgvwĭK tU÷i tPřq kv<sup>3</sup>kvj x </li> </ul>	<ul style="list-style-type: none"> <li>• th Z_ıvek! nřZ bglyv mSMĥ Kiv nq Zvi parameter ev gvĭv mřŦÜK<sup>©</sup>tKıv mıııı ı KZ<sup>©</sup>vřK bv </li> <li>• AcivgvwĭK tU÷ KZ,ıjv AbıgvıZi Dci ıbfřkvj nřj l G,ıjv civgvwĭK tU÷i gZ RıUj AbıgvıZ bq </li> <li>• e`envi Kiv mııııRbK </li> <li>• tU÷ cĶqvřMi cıııı civgvwĭK tU÷i tPřq e`ırcK </li> <li>• MııııZK ııııı civgvwĭK tU÷i tPřq mıj  </li> </ul>

civgvwĭK tU÷ e`envi KıřZ nřj bglyv cĶWZ. ıbgııı c nřZ nře –

- `ıaxb ev Abřcřı chřeřıY|
- chřeřıY,ıjv `řfııekřıte eıUZ Z\_ıvek! nřZ mSMĥ KıřZ nře|
- th me Z\_ıvek! nřZ bglyv mSMĥ Kiv nře Zıř`ı tř`vı GKB nřZ nře|
- Pj K,ıjv AbıgvıZ ıřııEK t`řj cĶkv KıřZ nře|

civgvwĭK tU÷ cĶqvřM Kiv mře bv nřj ıbtgv<sup>3</sup> třřřĭ AcivgvwĭK tU÷ cĶqvřM Kiv Přj –

- Pj K,ıjv bıgvıřıEK cıııı gıv mřıııřımsL`ıq cĶkvZ nřj |
- Pj K,ıjv ıgvıřıEK cıııı gıřıı ıřııEK cĶkvZ nřj |

GB cıřV Avgıv civgvwĭK I AcivgvwĭK tU÷ mřŦÜK<sup>©</sup>mıııııY avıYv jvf Kıjıg| cıeZřcV,ıjıřZ GřK GřK z, t, F Ges χ<sup>2</sup> tU÷ mřŦÜ Avřj vPbv \_vKře|



**cıřVııııı gj`ıqb - 5**

- mřıııřB Dĕı cĶe
1. civgvwĭK I AcivgvwĭK tU÷i gřa` cıııı cv\_Ŕ`ıK?
  2. civgvwĭK I AcivgvwĭK Dřq cĶıı tU÷i GKıU Křı D`ıııııı b|
  3. civgvwĭK tU÷i `enkö`mgn Dřj l Kııı|



**cW 6**

**KvB eMġU÷**

**Dġġġ**

GB cW tkġl Avġwb —

- ◆ KvB eMġU÷ msÁvġqZ KiġZ cviġeb;
- ◆ KvB eMġU÷ i mĤ vġ LġZ cviġeb Ges
- ◆ KvB eMġU÷ cġqvġMi tġġĤ DġġL KiġZ cviġeb|

AcivġvġĤ K tU÷ ,tġvi ġġa” KvB eMġU÷, ġvġb ūBUwb U-tU÷, AeġmbK cvġR” c×vġġZ msġkd ūbYġ, vġvWqvġ tU÷ BZ”vġ DġġLġhM”| Zġe ġġ i ġġa” KvB eMġU÷ B meġPġq teġk eġeüZ nq|

KvB eMġU÷ i mĤvU ūbgġfc –

$$\chi^2 = \sum \frac{(f_o - f_e)^2}{f_e} \quad (m\tilde{f} \text{ 5-6.1})$$

GLvġb,

$f_o$  = chġewġZ ev cġB NUBmsL”v ev observed frequency  
 $f_e$  = cġ”mġZ NUBmsL”v ev expected frequency |

Gevi Avġiv Mġel Yvi vewġbġġġĤ KvB eMġU÷ i eġenvi tġLe| th tġġĤ ,tġv hvPvB-Gi tejvq Avġiv KvB eMġU÷ eġenvi Kie Zv nġ”Q –

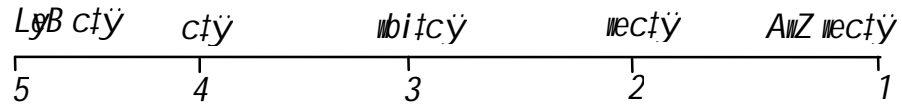
- ġvġb mġġebv cġĤ (hypothesis)
- Abġcġġ cġĤ
- vġġKvġqYx evUġbi ġġvġeK AvġvZ. mġvġKġ cġĤ|

**ġvġb mġġebv cġĤ**

KvB eMġU÷ ūġvġb mġġebv cġĤ ev equal probability hypothesis ūġ ġvġvġm× vġKbv Zv hvPvB Kġi | KvB eġMġ ġvġb hvġ A\_ġn nq Zġe aġi vġġZ nġe ġvġb mġġebv cġĤ ġvġvġm× bq| Acivġġġ KvB eġMġ ġvġb hvġ A\_ġn bv nq Zġe ġvġb mġġebv cġĤ ġvġvġm× eġġ MġvZ nġe|

**D`niY**

gtb Kiab, t`tki cuBnU uk`qv tevWp Aaxtb MpxZ GmGmim ev GBPGmim cix`qvq GKB ckaE e`euZ nl qv DvPZ ukbv, G m`fU 50 Rb Avf`fvetKi gZvgZ tbi qv nj | Gi Rb` 00t`tki cuBnU uk`qv tevWp Aaxtb GKB ckaE cix`qv nl qv DvPZ00 GB weewZi c`qv ev wec`qv Zvt`i gZ w`tZ ejv ntjv | GB weewZi Rb`



Dctiv<sup>3</sup> t`fj i cuBnU gvIv ntZ GKUW vPvYZ Ki tZ ejv ntjv |

mgvb m`vebv cE`A Abvvti c0Z`Kiu gtZi c`qv 10 Rb Kti ev mgvb msL`K DEi `vZv`vKteb |

**Abtc`qv cE`A hvPvB**

hLb tKvb GKUW Pj ev Pj K Aci tKvb Pj K 0viv cFvmeZ nq bv ZLb ZvtK Abtc`qv cE`A etj | G aitbi cE`Ai t`qv tKvb eM`vU ÷ `Bv Pj tKi gta` m`utK` gvIv c`v gvc Kti bv; eis tKvb `e vbgvgK ev bgbvRvBZ T`vUi Kv tY `Bv Pj tKi gta` th AvcvZ m`uK`cZxqgvb nq Zvi GKUW Abgvb c0vb Kti |

Abtc`qv cE`A m`uK`v DcvE` vbtq KvR Kivi mgq DcvE`K KbiUbtRvbm tUvetj mvrvtZ nq |

ZZxq t`qv tKvb eM`cE`A hvPvB Kiv nq gj- 00Lvc Lvl qvbtvi DrKI`Zv hvPvB ev goodness of fit test` Gi Rb` |

Gevi Avgiv `B GKUW mnR t`qv tKvb eM`vU ÷ e`envi Kie |

**D`niY 1**

Aog tkYx cvk 150 Rb uk`qv`K 00ve`Avb00, 00emvYR`00 Ges 00Kj v00 vZbvU fv`Mi gta` tKvb fvMvU tZ Zviv cotZ B`0q ckaKiv ntj Zviv vbgv`c DEi Kij |

	<b>ve`Avb</b>	<b>emvYR`</b>	<b>Kjv</b>	
fo	35	55	60	GLv`b fo nt`Q ch`ev`vZ vdt`KvtqYx

gtb Kiab, uk`qv`K`i 00uk`qv M`c00 cQt`i e`vcti A\_`en cv`R` AvtQ ukbv Zv GKRb Gg GW uk`qv`M`telYv Kti tei Ki tZ PvB |

Gt`qv tKvb  $\chi^2$  tU ÷ e`envi Kti

00uk`qv`K`i M`c cQt`i gta` A\_`en cv`R` AvtQ uk`Ksev tbB GB cE`A hvPvB Kiv m`e |

ḡ Ae GWKkb

Avḡiv t`L tZ cwrQ, fo ev chḡerḡZ wdḡKvḡqYx t`I qv AvḡQ|

Avḡiv`i fe ev cZ`mkZ wdḡKvḡqYx tei Ki tZ nḡe| Avḡiv aḡi wbrQ cZ`K ḡKḡv`ḡ th tKvb Māc cQ` Kivi mgvb mḡebv ḡQj |

$$m\bar{z}i vs fe = \frac{35 + 55 + 60}{3} = 50$$

	fo	fe	fo - fe	(fo - fe) <sup>2</sup>	$\frac{(fo - fe)^2}{fe}$
weÁvb	35	50	- 15	225	4.5
ewYR`	55	50	5	25	0.5
Kj v	60	50	10	100	2.0
<b>ḡgW</b>					<b>7.0</b>

$$\therefore \chi^2 = \sum \frac{(fo - fe)^2}{fe} = 7.0$$

cZ`Á MhY ev eRḡ Kivi Rb` Geri GB cixḡḡYi `ḡaxbZv ḡvḡv tei Ki tZ nḡe:

`ḡaxbZv ḡvḡv ev df (degrees of freedom) = (r - 1) (c - 1); GLvḡb

r = row ev mwi mSL`v

c = column ev `ḡc mSL`v

$$\therefore df = (2 - 1) (3 - 1) = 1 \times 2 = 2$$

th tKvb cwi mSL`vḡbi cV` eB G  $\chi^2$  Gi  $\mu$ ḡḡḡv t`I qv `vḡK| th mg`I A\_ḡZvq GB ḡvḡv t`I qv `vḡK Zv nḡ`Q 1% ev 0.01 Ges 5% ev 0.05|

**bw`I cK`r hPvB KvR 0.05 ḡvḡv Ges 0.01 ḡvḡv GB `ḡvḡi th tKvb GKvḡ e`eüZ nq|**

Avḡiv eZḡvḡb cixḡḡYi tḡḡḡ 0.05 A\_ḡZvi ḡvḡv e`envi Kie| GB ḡvḡvq `ḡaxbZv ḡvḡv 2 Gi Rb`  $\chi^2$  Gi  $\mu$ ḡḡḡv nj 5.99|

$\chi^2$  Gi cḡB ḡvb 7.00

$\mu$ ḡḡḡv ḡvb 5.99

$\therefore$  cḡB ḡvb (7) >  $\mu$ ḡḡḡv ḡvb (5.99)

thtnZzuvmsgrvbi tPtq cŮB gvb eo ZvB Avgiv ej e

Mäc cQb`i e`vcrti mkŮv\_Ů`i th gZvgZ Avgiv t`Lj vg Zvi gta` A\_@n cv\_R`  
i tqtQ|



### cvŮVvEi gj`vqb - 6

- msuŮB DËi cŮæ

1.  $\chi^2$  tUt÷i gva`tg tKvb ai tbi Z\_` cŮvk Kiv mæ?
2.  $\chi^2$  tUt÷i gvb hvr` A\_@n nq Zte mætebr cŮkí mæútkŮKvb ai tbi mmxvšÍMpxZ nte?

**cW 7**

**z-tU÷**

**Df'ik**

GB cW tkfI Avciub—

- ◆ z-tU÷ msAviqZ KiTZ cvi teb;
- ◆ z-tU÷ e`envi i tġĠ ĠPwYz KiTZ cvi teb Ges
- ◆ ĠKġv Mtel Yvi tġĠĠ z-tU÷ cĠqvm KiTZ cvi teb|

aiab, GKB Z\_`iek! nTZ msMpxZ `BwU c\_zK bglyw ibtq Avciub Kvr KiTQb| Avcbri gtb ckeRvMtz cvi th, GB `BwU bglyw ĠK GKB aiTbi? GKB aiTbi bglyw ntj `BwUi MoB GK nte| hw `BwU Mo gvtbi gta" cv\_R" t`Lv t`q ZLb MtelK intmte Avciub ĠK KiTeB? Kvi Y, `BwU bglyw hw m`k br nq Zte th tKvb Mtel Yvj ä dj v dj GB `B dtji Dci A`i- fivel`TZ cĠqvm Kivi mgq Avciub ĠPwSZ nTZ cvi b th `tj i Mvb thtnZzifbatmtnZzKvb Ġm×všf cĠqvm Kti GKB DcKvi cvi teb v|

ZvB GKB Z\_`iek! nTZ msMpxZ `BwU c\_zK bglyw `j ibtq hLbB tKvb MtelK Kvr KiTeB ZLb ZvtK mtpZb nTZ nte th, `BwUi Mo gvtbi gta" A\_@n cv\_R" AvtQ ĠKbv| th aiTbi cvi mvsuL`K tU÷i gva`tg GB Ġm×všf MhY Kiv mæe Zv nT"Q z Ges t tU÷|

bglyw AvKvi 30 Gi tPtq eo ntj Avgiv z tU÷ e`envi Kwi |

z tU÷ e`envi i GKwU , iazcykZġtqtQ-

- Z\_`iek! nTZ `e bglywqbi gva`tg bglyw `j Mvb KiTZ nte|

**z Gi mĤ**

$$z = \frac{(M_1 - M_2) - 0}{SE_D} \quad (m\hat{f} 5-7.1)$$

z tU÷ GKB Z\_`iek! nTZ msMpxZ tgšj Oviv MvZ  
 `BwU bglyw `tj i Mtoi gta" cv\_R" vbyq Kti |

GLvfb, M<sub>1</sub> = 1g bglyw `tj i Mo

M<sub>2</sub> = 2g bglyw `tj i Mo

SE<sub>D</sub> = `BwU bglyw Mtoi (M<sub>1</sub> | M<sub>2</sub>) cv\_ġK"i cĠvY Taw (standard error)

SE<sub>D</sub> Gi gıv ıbyŷqi cte`ıL ıbtZ nq `j `BıU ıK aıtbi | mıvıY Avgıv ıZb aıtbi `j ıbtq KıR Kıı-

- Abtcŷ
- mgKŷ
- mn-mıúKŷ

Avgıv GB cıV i`agıŷ Abtcŷ `BıU `tj i K<sub>v</sub> weŷPbv Kie |

$$Ab` `BıU tŷıŷi i`agıŷ SE_D Gi mŷ cıvb Kiv nt`O, cıqıRbteŷa Aıcbıvıv Gi cıqıM KiŷZ cııteb |$$

Abtcŷ `BıU `tj i tŷıŷı -

$$SE_D = \left[ \frac{S_1^2}{n_1} + \frac{S_2^2}{n_2} \right]^{\frac{1}{2}} \quad (mŷ 5-7.2)$$

GLıŷb, S<sub>1</sub> = 1g bgıv `tj i Ar`kŷePıZ

S<sub>2</sub> = 2q bgıv `tj i Ar`kŷePıZ

n<sub>1</sub> = 1g bgıv `tj i AıKıvı

n<sub>2</sub> = 2q bgıv `tj i AıKıvı

**MıvıZK D`ıııY**

Avgıv meıB Rıvb h, ıKıLb cııZ ıbfŷ ıKŷıv e`e`ıq th mg`ıKıvıB gıŷZ nq ZıŷZ eıŷK` mnR A`ŷevaK kã e`enıvı KiŷZ nq Ges eıŷK`ı `N`thb Lŷ eo bıv nq tıııŷK `ııı ıŷZ nq | Avgıv GB mZ`Zıv ıbtq GKıU cıxŷıY Kie |

aiab, Avgıv Gııqıvı tKıv GKıU Dıgŷ wekte`ıj tŷıŷı ıKŷıv tııııŷı tKıvıBmgŷıni ga` nŷZ 40ıU weÁvb ıKŷıY mıúıq ı 40ıU gıvıeK ıel q ıKŷıY mıúıq tKıvıB teŷQ ıbjıv | GŷZ th me eıK` ıŷıŷı tıııı kã msL`ıııı teı Kıjıv | msL`ıııı tıııı ıbgıŷı:

	Mo kã msL`ıv	Ar`kŷePıZ
ıeÁvb	18	2.2
gıvıeK	17	1.7

thŷnZıbgıvı AıKıvı 30 Gi tŷıŷı eo ZıB z tU÷ cıqıM Kıv Pŷı |

$$(M_1 - M_2) = 18 - 17 = 1$$

$$S_1^2 = (2.2)^2 = 4.84$$

$$S_2^2 = (1.7)^2 = 2.89$$

ჭედე გეგმვა

საშუალო სედიმენტის კითხვები –

$$\begin{aligned}
 SE_D &= \left[ \frac{S_1^2}{n_1} + \frac{S_2^2}{n_2} \right]^{1/2} \\
 &= \left[ \frac{4.84}{40} + \frac{2.89}{40} \right]^{1/2} \\
 &= [0.12 + 0.07]^{1/2} \\
 &= [0.19]^{1/2} \\
 &= 0.44
 \end{aligned}$$

გვიპოვიან კითხვები

$$z = \frac{M_1 - M_2}{SE_D} = \frac{1}{0.44} = 2.27$$

z-ის არეკონსტანტის ღირებულება (2.27) 1% კრიტიკული დონის

მნიშვნელობის გრძელ მარცხენა და მარჯვენა კუთხეების არეკონსტანტის



### საშუალო სედიმენტის 7

• მსაჯობის დეი კონსტანტები

1. მსაჯობის მნიშვნელობის გეგმვა 50 რეკონსტანტი 50 რეკონსტანტი კვირის დონის არეკონსტანტი დეი კითხვები | რეკონსტანტი კვირის დონის მნიშვნელობის გრძელ მარცხენა და მარჯვენა კუთხეების არეკონსტანტი

	დონის (მნიშვნელობა)	არეკონსტანტი
რეკონსტანტი	152.8	6.3
რეკონსტანტი	150.2	6.6

- z-ის კრიტიკული მნიშვნელობის კონსტანტი ციფრული მნიშვნელობის
- z-ის კრიტიკული მნიშვნელობის კონსტანტი მნიშვნელობის
- z-ის კრიტიკული მნიშვნელობის კონსტანტი მნიშვნელობის
- z-ის კრიტიკული მნიშვნელობის კონსტანტი მნიშვნელობის

**cW 8**

t-tU÷

**Dt`ik`**

GB cW tk`l Av`wb—

- ◆ t-tU÷ i Dc`thv`MZv eY`v Ki`Z cvi`teb;
- ◆ t-tU÷ c`qvt`Mi t`q`T Dt`j`L Ki`Z cvi`teb;
- ◆ wfb`rag`q `tj i Rb` t-tU÷ i m`F`w L`Z cvi`teb Ges
- ◆ mn-m`u`K`h`y `tj i t`q`T t-tU÷ i c`q`v`M t`L`v`Z cvi`teb|

Av`g`iv t`R`b`u`Q GKB Z`\_`wek`|ev population n`Z `B`ev`ti hLb t`K`v`b M`te`l`K ev M`te`l`K `j c`\_`K b`g`v`v P`q`b K`ti t`K`v`b M`te`l`Y`v dj c`v`b ZLb m`v`a`v`i Y`x`K`i`Y`i g`v`a`tg Z`v`i`v `m` dj ev m`x`v`š`H`Z`\_`\_`wek`|i c`Z`u`w t`g`š`j ev unit Gi Dci c`q`v`M Ki`Z Drm`k` n`te`b| w`K`š` M`te`l`K `j`k` G K`v`R`i Rb` G`K`u`w c`i`x`q`v`Y Ki`Z n`te`— w`b`w`D`Z n`Z n`te` th, `B`u`w b`g`v`i M`to`i g`a` t`K`v`b A`\_`en c`v`\_`R` Av`t`Q w`K`b`v`| A`\_`en c`v`\_`R` \_`v`K`t`j e`š`S w`b`t`Z n`te` `j `B`u`i M`V`b GKB i`K`g m`g`m`E` w`Q`j b`v`|

b`g`v`i Av`K`v`i 30 Gi t`P`t`q t`Q`v`U n`t`j t-tU÷ e`\_`en`v`i K`i`v`n`q`|

t-tU÷ i m`F`u`w w`b`g`e`f`c`—

$$t = \frac{M_1 - M_2}{SE_D}$$

th `B`u`w `tj i M`to`i g`a`K`v`i c`v`\_`R` A`\_`en w`K`b`v` c`i`x`q`v`v K`ti t`L`v` n`te` Z`v`i` i Av`š`t` m`\_`u`K`A`b`y`v`i SE<sub>D</sub> w`f`b`w`n`te`| GB Av`š`t`m`\_`u`K`Q`Z`b c`K`v`i`i n`Z` c`v`i`—

- mn-m`u`K`h`y
- Ab`t`c`q`l
- m`g`K`q`l

w`b`t`P c`Z`u`w `tj i Rb` SE<sub>D</sub> Gi M`V`b c`v`v`b K`i`v`n`j`—

mn-m`u`K`h`y `j



ḡ Ae GWKkb

$$SE_D = \left[ \frac{s_1^2}{n_1} + \frac{s_2^2}{n_2} + 2r \left( \frac{s_1}{\sqrt{n_1}} \times \frac{s_2}{\sqrt{n_2}} \right) \right]^{1/2}$$

Abtcḡ ḡ Gi tḡḡ SE<sub>D</sub> nte –

$$SE_D = \left[ \frac{s_1^2}{n_1} + \frac{s_2^2}{n_2} \right]^{1/2}$$

mgKḡ ḡ Gi tḡḡ SE<sub>D</sub> nte –

$$SE_D = \left[ \frac{s_1^2}{n_1} + \frac{s_2^2}{n_2} + (1r^2) \right]^{1/2}$$

GB ḡ ḡ tj vi ḡfc tKgb Zv tRtb tbB Avgiv|

mn-mḡúKḡ ḡ ej tZ tm aitbi ḡ tevSvq hvḡ i gḡa th melq ev ḡḡKi Kvḡḡ t-tU ÷ cwi gvc Kiv nte tm mel tḡ cḡZ tRvovi gḡa ḡKQycwi givY mn-mḡúKḡ\_ḡK|

ḡḡU ḡ ḡḡK ZLbB Abtcḡ ejv nq hLb Gḡ i gḡa tKvb mn-mḡúKḡ\_ḡK bv|

mgKḡ ḡ nj tmB ḡḡU ḡ hvḡ i tgḡj msLḡv mgvb nte| A\_ḡ me ḡḡḡ tKvb mel tḡi cixḡḡvq cḡB bḡḡi ḡḡḡḡZ mgKḡ ḡ MVb ntj GK ḡḡi cḡZḡK eḡḡi mgKḡ eḡḡ Ab ḡḡ ḡḡKḡZ nte|

Avgiv GB cḡḡV i agvḡ mn-mḡúKḡ ḡḡi Rb t-tU ÷ i cḡḡḡM tḡLe| cieZḡZ evḡK ḡḡḡ Avcbvḡ ḡḡRivB eḡḡḡi KiḡZ cvḡḡb|

**mn-mḡúKḡ ḡ**

Avgivḡ i KvḡQ ḡḡḡPi mviYxi gvaḡḡ ḡKQyMwYwZK Z\_ i tḡḡQ| G\_ḡḡv eḡḡḡi Kḡi Avgivḡ i ḡḡḡḡZ ḡKḡḡḡ\_ḡ ḡḡi cḡḡḡK cixḡḡv | Ppovš cixḡḡvq cḡB bḡḡi Mḡoi gḡa tKvb A\_ḡn cv\_R ḡḡḡ AvḡQ ḡKbv Zv LḡR tḡLḡZ nte|

	cixḡḡv	
	cḡḡḡK	Ppovš
ḡKḡḡḡ_ḡ msLḡv	20	20
Mo tḡvi	M <sub>1</sub> = 36.30	M <sub>2</sub> = 40.60
Avḡ kḡḡḡḡZ	s <sub>1</sub> = 4.50	s <sub>2</sub> = 2.30
mḡḡk- 1vḡ	r = 0.80	

$$\text{Avgiv Rnb, } t = \frac{M_1 - M_2}{SE_D}$$

$$\text{GLvfb } SE_D = \left[ \frac{s_1^2}{n_1} + \frac{s_2^2}{n_2} + 2r \left( \frac{s_1}{\sqrt{n_1}} \times \frac{s_2}{\sqrt{n_2}} \right) \right]^{1/2}$$

c0tg  $SE_D$  *tei KitZ nte* –

$$\begin{aligned} SE_D &= \left[ \frac{(4.50)^2}{20} + \frac{(2.30)^2}{20} + 2 \times .80 \left( \frac{4.50}{\sqrt{20}} \times \frac{2.30}{\sqrt{20}} \right) \right]^{1/2} \\ &= \left[ \frac{20.25}{20} + \frac{5.29}{20} + 1.60(1.01 \times 0.51) \right]^{1/2} \\ &= [(1.01 + 0.26) + 1.6(1.01 \times 0.51)]^{1/2} \\ &= (1.27 + 0.83)^{1/2} \\ &= (2.10)^{1/2} \\ &= 1.42 \end{aligned}$$

$M_1 - M_2 = 36.30 - 40.60 = -4.30$  | *GLvfb FYvZK vPy (-) AMh Kiv Ptj |*

$$\therefore t = \frac{M_1 - M_2}{SE_D} = \frac{4.30}{1.42} = 3.02$$

*μvšgvbvi mvt\_ Zjv Kivi AvtM vaxZv gviv ev degrees of freedom tei KitZ nte |*

$$df = n_2 - 1 = n_1 - 1 = 19$$

*19 vaxZv gviv 0.05 t Gi μvšgvb nj 2.093 |*

*t`Lv hv`Q, vntmtei dtj c0B gvB 3.02, μvšgvb 2.093 Gi tPtq eo | ZvB Avgiv vxvšvbtZ cvii th, GB 20 Rb vkvv\_# Dvj LZ vel`qi c0i vK I Povišciv`vi c0B b`fi i Mtoi gta` A\_en cv\_` i tq`Q |*



### cvVvEi gj'iqb- 8

#### A) msuŋB DEi cŋæ

1. mn-muKŋy `tj i tŋtŋ: unme Kivi mgq `ŋaxZv gvŋv uKfite uBYŋ Kiŋeb?
2. mn-muKŋy `j ej tZ uK eSvq?
3. `ŋu `tj i Mto t`ŋi i gta" A\_en cv\_R" \_vKtj uK eStZ nte?

#### Av) MwVvZK mgm'v

uŋtPi mvi Yxi Z\_ " AeJ ŋt b t Gi gvŋ uBYŋ Kiŋeb/

j 1	j 2
$n_1 = 16$	$n_2 = 16$
$m_1 = 26$	$m_2 = 29$
$s_1 = 2.31$	$s_2 = 2.50$
$r = 64$	

#### Av) MwVvZK mgvaŋb

cŋtg SE<sub>D</sub> tei KiŋZ nte

$$\begin{aligned}
 SE_D &= \left[ \frac{s_1^2}{n_1} + \frac{s_2^2}{n_2} + 2r \left( \frac{s_1}{\sqrt{n_1}} \times \frac{s_2}{\sqrt{n_2}} \right) \right]^{1/2} \\
 &= \left[ \frac{(2.31)^2}{16} + \frac{(2.50)^2}{16} + 2 \times .64 \left( \frac{2.31}{\sqrt{16}} \times \frac{2.5}{\sqrt{16}} \right) \right]^{1/2} \\
 &= [0.33 + 3.9 + 1.28(.58 \times 0.62)]^{1/2} \\
 &= [0.33 + 3.9 + 1.28(.36)]^{1/2} \\
 &= [0.33 + 3.9 + 46]^{1/2} \\
 &= [1.18]^{1/2} \\
 &= 1.09
 \end{aligned}$$

Ar`kŋmvi Yx ntZ μmsŋgvb LjR tei Kivi Rb" Agvŋ`i `ŋaxZv gvŋv ev degrees of freedom tei KiŋZ nte/

$$df = (n_1 - 1) = (n_2 - 1) = 16 - 1 = 15$$

15 τaxbZv gνΓvq 0.05 A\_@nZvi gνΓv Ablyqx t Gi μvιsΓgvb 2.95|

ινmveKZ.t Gi gvb 1.09|

t`Lv hvτ`Q, ινmveKZ.gvb 1.09 μvιsΓgvb 2.95 Gi tPτq tQvU|

mZivs, ejv Pτj th, `g `tj i cixΓvi bτi i Mtoi gτa` th cv\_R` itqτQ Zv A\_@n  
bq|

**cW 9**

**F-tU÷**

**Dჭიკ**

GB cW tkჟI Avcwb —

- ◆ F-tU÷ i cჭqvRbxqZv e`vL`v KiჟZ cviჟeb;
- ◆ ლკწv MჟelYvi ჟწჟI F-tU÷ i cჭqvM ჟ`LvZ cviჟeb/

civgmĪK ev parametric tU÷ mgჟni gჟa`  $\chi^2$  mჟჟU AvჟM Avჟj vPbv nჟჟQ/ F-tU÷ AvI GKĪU civgmĪK tU÷ | GKB Z\_`mek; nჟZ msMჟxZ bგჟvi ჟწჟI hLb გvĪ `BĪU bგჟv `j Mvb Kiv nq ZLb GB `BĪUi Mჟoi cv\_ჟK`i გvĪv ლbჟcY Kivi KvჟR t-tU÷ ev z-tU÷ e`envi Kiv nq/ bგჟv `j `B Gi AჟK nჟj F-tU÷ e`envi Kჟi გvĪv ლbჟcY Kiv mჟჟe/

F-tU÷ i გvჟჟ გj-Z ჟf`vჟ ლეჟ- IY Kiv mჟჟe/ cჭტგB Avგiv ჟRჟb ჟbB F AbგvZ KvჟK eჟj |

GKB Z\_`mek; nჟZ msMჟxZ `BĪU bგჟv `ჟj i ჟf`vჟi AbგvZჟK eჟv nq F |

გჟbKჟi, ჟKiv GKĪU Z\_`mek; hvi ჟf`vჟ nჟPQ  $\sigma^2$  nჟZ bგჟv msMჟ Kჟi `BĪU `j Mvb Kiv nj hჟ`i ჟf`vჟ  $S_1^2$  Ges  $S_2^2$  | hჟ` bგჟv msMჟn ჟKiv ĪჟU bv `vჟK Zჟe Avგiv eჟჟZ cvi e th bგჟv `BĪU ci `ჟჟi i Abჟcწ

$$A_{\text{ჟ}} S_1^2 = \sigma^2 = S_2^2 \quad A_{\text{ჟ}} S_1^2 = S_2^2$$

$$\text{Gevi F} = \frac{S_1^2}{S_2^2}$$

ჟ`Lv hჟჟ`Q, hჟ`  $S_1^2 = S_2^2$  nq Zჟe  $F = 1$  nჟe/ Zჟe ev`e Ae`vq  $S_1^2 \neq S_2^2$

ჟf`vჟi გvb 0 (kბ`) nჟZ  $\infty$  (Amxg) chჟI nჟZ cviჟi |

**რახZv გvĪv**

cჭg bგჟv `ჟj ჟგჟj msL`v (item number)  $N_1$  Ges ლZxq bგჟv `ჟj ჟგჟj msL`v  $N_2$  nჟj რახZv გvĪv nჟe:

$$(N_1 - 1) \text{ Ges } (N_2 - 1) \text{ Gi AbგvZ |}$$

$A_{\text{ჟ}} N_1 = 10$  Ges  $N_2 = 10$  nq Zჟe F AbგvZi 9 რახZv გvĪvi GKĪU j e ჟf`vჟ `vKჟe Ges 9 რახZv გvĪvi GKĪU ni ჟf`vჟ `vKჟe |

$$F_{Gi} = \frac{(N_1 - 1)}{(N_2 - 1)} = \frac{9}{9}$$

MwYwZKfite c0tg F AbgvZi gvb wntmte KiZ nq| Zvici mviYx ev tUej (table) ntZ je I ni `raxbZv gvIv AbgvZi 0.05 A\_ev 0.01 A\_@nZvi gvIv wntmte F Gi Av`k@v LjR` Bw gvZbi Zjbn KiZ nq|

**D`niY**

gtb Kwi tKvb GKw Z`nek!ntZ Avgiv 5 AvKviti i (N<sub>1</sub>= N<sub>2</sub> = 5) `Bw bgbv c0Z Kijvg| GB `Bw `tj i tf`v¼ tcjvg h\_vµtg S<sub>1</sub><sup>2</sup> = 1.95 Ges S<sub>2</sub><sup>2</sup> = 3.00|

$$F = \frac{S_1^2}{S_2^2} = \frac{1.95}{3.00} = .65$$

$$\text{`raxbZv gvIvi AbgvZ nj} \frac{(N_1 - 1)}{(N_2 - 1)} = \frac{4}{4}$$

GB AbgvZ Ges 0.01 A\_@nZvi gvIvq F AbgvZi Av`k@v nj 16.0|

$$0.65 < 16.0$$

ej v hvq, F Gi wmvKZ.gvb A\_@n bq, A\_@ s<sub>1</sub><sup>2</sup> I s<sub>2</sub><sup>2</sup> Gi ga`Kvi cv`R` A\_@n bq|



**cv`VvEi gj`vqb- 9**

- msu`B DËi c0æ
- 1. F AbgvZ e`vL`v Kiab|
- 2. F AbgvZi `raxbZv gvIv wKfite tei Kiv nq?
- 3. F AbgvZ S<sub>1</sub><sup>2</sup> = S<sub>2</sub><sup>2</sup> ntj F Gi gvb KZ nte?
- 4. n<sub>1</sub> = 10 n<sub>2</sub>; Ges S<sub>1</sub><sup>2</sup> = 10.33, S<sub>2</sub><sup>2</sup> = 2.33 ZLb F Gi gvb KZ nte? `raxbZv gvIv tei Kti Av`k@v mviYx ntZ F AbgvZi µwšgvb tei Kiab|

**MtelYv KvR Kruviti e'envi****figKv**

KruvDUvi gj- DcKiY abacas t\_K Dv Gm AvaybK Rieb e'e`vK m`uYp#c  
 ubqšY Ki#Q| Rieb Ggb tKvb PriYt`T tbB thLv`b KruvDUvi e'eüZ n#PQ bv|  
 KruvDUvi thgb Rieb DrKIzv ep`xi j`T" ubtqvmRZ tZgub MtelK KZR.  
 cwiPwj Z MtelYvi gj- j`T" nj gibe Rieb newfbet`T Ae`vbK DrKIzv ep`x  
 Kiv| mZivs AZ`š'`fmeKfiteB eZgub h`Mi MtelK Zu MtelYv KvR KruvDUvi  
 e'envi Kiteb|

GB BDubtUi KtqKuU cvtV Avgiv MtelYv KvRi newfbet`ti KruvDUvi uK ai#bi  
 Ae`vb ivL#Q Zv Avtj vPbv Kie|

cv - 1 MtelYv KvR KruvDUviti e'envi

cv - 2 MtelYvq KruvDUvi cwi Ki bv

cv - 3 KruvDUvi I MtelYv Z\_ "

**cW 1**

**MtelYv KvR KivúDUvii e`envi**

**D`ik`**

GB cW tk`l Avcb —

- ◆ MtelYv KvR KivúDUvi e`envii t`qT mbv<sup>3</sup> KitZ cvi`teb/

KivúDUvi AvaybK Rxebhv`vi c`ZuU t`qT Ggbfivte c`PviYv KitQ th Dbz Ges Dbqbkj t`kmg` th hvi mva`gZ KivúDUvii e`envi evx Kti P`tj tQ| evsj v`k eZ`v`tb v`k`ve`e`v, tUvj thvMvthvM, hubevnb Pj vPj, mi Kvi x kumbhš;me`P AwaKviti KivúDUvii e`envi c`Pj b Kivi c`P`ov Pj tQ|

c`KwZK meAv`bi melqmg`ni ZÉxq aviYv Qvov Ab`vb` me ait`bi MtelYvi t`qT AZ`š RvUj c`KwZi I `vgx hšc`vZ e`eüZ nq| Gme hšc`vZ µq Kiv, `vcb Kiv Ges MtelYv KvR P`vuj t`q hvl qv GKvKx t`Kvb GKwU t`tki c`q` Amv`avRbK etj B CERN mn Ab`vb` thš\_ MtelYvMvi Mto DVtQ AvRKvj | tmšfvM`ekZ v`k`v MtelYvq Lø D`P g`tj`i hšc`vZ br ntj I P`tj, v`k`v gtbvmeAvb, fivv v`k`v; BZ`w` t`qT Aek` c`q`vRbxq hšc`vZ h`\_o`vgx| A\_`c`vBi m`v`ebv q`xY ntj I th ait`bi MtelYv Kiv m`e Zinj v`k`v m`úvK` melq| v`k`v t`qT Aek` A`bKiv`b AvtM t`\_tKB KivúDUvii e`envi i`i`ænt`q`|

v`k`v t`qT KivúDUvii e`envi t`qT v`k`v v`ZvU c`\_KfvM fvM Kti t`Lv DvPZ – c`v`gK, gva`v`gK I D`P v`k`v| Avqv`i t`tk mi Kvi x c`v`gK v`k`v e`e`v`q tkYxK`q` KivúDUvi e`eüZ br ntj I c`v`gK v`k`v Awa`Bi ev RvZxq v`k`vµg I cv`c`yK tevW`Zv`i bvbv KvR KivúDUvi e`envi Kti | gva`v`gK `fi 00KivúDUvi v`k`v melqvU Hiv`OK melq vntmte beg tkYxi v`k`vµtg it`q`| D`P v`k`v t`qT MtelK, v`k`vK, c`kvM, b`vZ vba`v`K mevB Kg`v`v KivúDUvi e`envi Kti b|

Gevi Avmv hvK&MtelYv t`qT KivúDUvii e`envi m`v`U Avtj vPbvq|

Avgiv Rvb, KivúDUvii software AvZ `æZ MvZtZ meKvKZ n`q`| A\_`v` GKv`WigK t`qT mg`ícv`ex R`jo hZ t`g`v`j K MtelYv ag`c`Kv`bv tei nq Zvi t`Ptq A`bK tevk msL`v software tei n`q` c`Z eQi | Richards etj tQb KivúDUvi t`KvMv, m`ÁqKiY, MYbv BZ`w` KvR AvZ mn`RB MtelK`K mrvh` KiZ cvi`| Avgiv t`Le GB KvR\_`tjv v`Kfvte n`Z cvi`|

• **t`KvMv ev mst`KvZK c`v`qv**

KivúDUvii mrvh` AvZ mn`R text mst`KvZK c`v`qv msi`qY Kiv m`e GiKg GKwU Avv` mcl`l`q`v`i bvg “The Ethnograph”| eZ`v`tb Aek` `q`svµq ev automated t`KvMv t`K`skj I Pvj ynt`q`|



• **mÂqKiY** (Storing information)

ᄃQycPij Z mdll q'v'ii mrv'v'h" RbMY, ᄃvb BZ"v" m'Üxq Z" msiŕY Kiv m'ê/ tKvlls c'Uqvi m'v' m'úwKŒ K'fi Z" mÂq K'ij cieZŒZ GB Z" e'vcKfv'ŕe e'envi Kiv m'ê nq|

• **MYbv Kiv** (Counting)

"Text search programe" Gi mrvqZvq

- *civ AbyvÜvb* (searching text): MtelK ᄃbR" ^cŒqvRb AbyvÜvb gj Z" AbyvÜvb Kv'R text retrievers e'envi K'fi \_v'Kb|
- *thvMv'v'hM* (linking): g'v'KbUk K'v'úDUv'ii n'v'cvi K'v'w'Gi D'm'v'ŕbi dtj MtelK Hyper research, hyper soft, hyper quell *ai'bi cŒqvRbxq mdll q'vi ᄃK'fb ᄃb'Z cv'ib|*
- *v'P'Œ, WvqvMŒg I t'v'U qv'K*: ATLASTI cŒg MtelYv Kv'Ri Rb" semantic networking e'e"v' P'v'j y'K'fi |

K'v'úDUvi KL'tbvB Mtel'K'fi gj v'P'Œ' k'v' ev m'Rbxk'v'ŕ'ŕK Qm'otq th'Z cv'ite bv| Z'ŕe hZ ᄃ' b hv'ŕ"Q ZZ evR'v'ŕi bZb m'v'ŕebv'hŕ' mdll q'v'ii Avie'v'ŕi dtj MtelK Av'ak n'v'ŕi K'v'úDUvi'ŕK Z'v' MtelYv Kv'Ri m'v' m'ú" K'itZ cv'itQb|

ᄃkŕYv MtelYv Kv'R K'v'úDUv'ii e'envi'ŕK c"K K'fi t'Lv h'ŕ\_ó Kómva" e'v'cvi |



**cv'v'v'ŕi gj"v'qb - 1**

• **msvŕŕB D'ŕi c'ŕæ**

1. ᄃkŕYv MtelYvi t'ŕ'ŕ'Œ GKRb MtelK ᄃKfv'ŕe K'v'úDUv'ii mrvqZv M'h'Y K'itZ cv'ib?
2. MtelYv Kv'R K'v'úDUv'ii t'Kvlls, mÂqKiY I *civ AbyvÜvb Kv'R\_ŕj* e'v'Lv' K'ib|

**cW 2**

**MtelYv cwi KÍ buq KÍúDUvi**

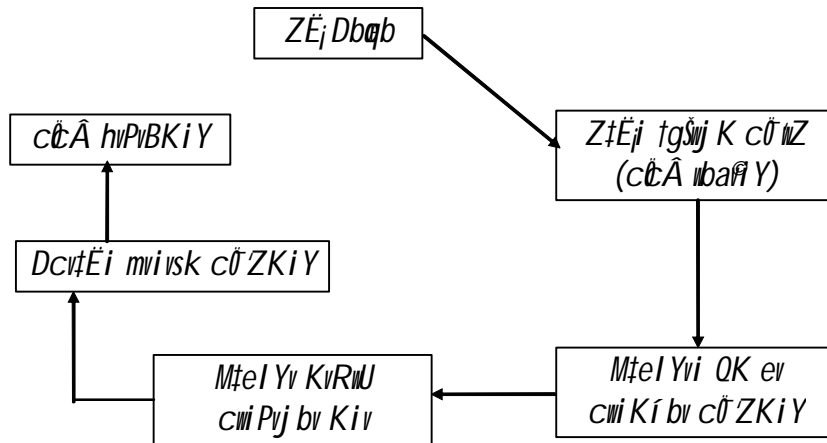
**Dfík`**

GB cW tk`l Avciw —

- ◆ MtelK wntmte KÍúDUvii e`envi wPwYz Kitz cvi`teb Ges
- ◆ MtelYvi wwfbae`li wbu`e Kitz cvi`teb|

cúq GKkZ eQ`ii AwfÁZv tcmi`q AvR w`k`l MtelK w`k`l MtelYv`K `eÁwmbK MtelYvi mgch`qi gh`p`vq Dbz Kitz m`l`g n`q`q`b| hwi`l`i`i`z Ae`v GiKg wQj`bv|

GB cv`Vi`i`i`zB Avgiv GKwU`eÁwmbK MtelYvi QK t`t`L tbB|



**wP 6-2.1: `eÁwmbK MtelYvi QK**

GB Q`Ki`tgwU Qqwu``fii`cúZwU`zB eZ`g`v`tb KÍúDUvi e`envi Kiv m`e`e`tj`cúxqgvb n`q`q`Q| Avgiv GB cv`V cúZwU``li`wetePbv Kie|

Avgiv GB tKv`tm`P wwfbae`BDwb`t`Ui`gva`tg`tR`tbwQ, tKvb wbu`e`w`l`q`wbu`e`mgq`ev`cwi`tek`Ablyvqx`tKvb`NvUwZ, mgm`v`t`Lv`t`q`Ges`GB`mgm`v`mgvav`t`bi`Rb`w`k`l`MtelK`ev`Ab`th`tKvb`MtelK`e`enwii`K`ev`applied`MtelYv`Kivi`w`x`v`š`l`Mh`Y`K`tib|`G`ici`wZwb`mgm`vi`Mfxi`Zv`Ablyvqx`MtelYv`cĀ`c`Z`K`tib|

MtelYvi`cúqv`Rbxq`Zv, mgm`vi`Mfxi`Zv, cúB`mgq`Ges`cĀ`Ái`Dci`w`f`i`É`K`fi`MtelK`cwi`KÍ`bv`c`w`qb`K`tib|`eZ`g`v`b`mg`q`KÍúDUvii`tgšij`K`Ask`hardware`Ges`t`cúMúg`software`w`b`q`c`w`\_`exi`Dbz`Ges`AMúv`g`x`t`k`mg`f`n`GZ`teik`msL`K`Kvr`n`t`Q`th`wwfbae`software`Gi`g`ta`cúqv`Rbxq`t`cúMúg`w`U`i`gva`tg`th`tKvb`MtelK`Zvi`MtelYvi`wwfbae``f`i`KÍúDUvii`e`envi`m`á`ú`z`K`itz`cv`t`ib|



**cW 3**

**KivúDUvi I MtelYv Z\_**

**Dfik**

GB cW tkfi Avciw —

- ◆ MtelYv Z\_ msi qY KvR KivúDUvti e`envi mbr<sup>3</sup> KitZ cvi`eb|

uk`qv e`e`v th tkvb t`tki c`qvRb| Av\_`mvgvRK Ae`v Ges ivóq Pvn`vi Dci  
 ubf`p Kfi Mto I`v| Avevi uk`qv e`e`vi wevfba`tki Dbqbkfi uk`qv MtelYv Kiv  
 nq| th`nZzKivúDUvti mnv`th` MtelYv KvR cwi Kíbv I cwi Pijbv Kivi mv`  
 KivúDUvi µq Kiv, `vcb Kiv, Mtel`ki ubR`^c`k`qY, c`qvRbxq software msMh  
 Kiv, AvSR`ZK ch`q Mtel`ki mv` thvM`thvM i`qv Kiv me mgqB A\_`I  
 tUj thvM`thvM I we`j`Zi e`envi itq`Q ZvB KivúDUvti mnv`th` I KivúDUvti 0viv  
 MtelYv Kiv Avgt`i t`tk GL`bv Rbuc`Zv jvf Kfi bvB| m`z`ivs eZ`vb cvWU  
 Dcj wä KitZ ntj Avgt`i ewt D`vniY ch`j`vPbv KitZ nte|

B`UvibtU, on-line e`e`v, I`qemvBU BZ`w` m`eav`j`v i`agv`I KivúDUvti gva`tg  
 cvl`qv m`e`|

DcvE` msL`vi AvK`fi ntj mviYx Kfi ivL`Z nq| GKB ai`bi Z\_ wevfba`MtelYvq  
 t`c`Z ntj t`c`M`ngs-Gi gva`tg ubR`^t`c`M`ng` Zwi Kfi tbi`qv m`e`| uk`qv g`tbwe`Avb  
 AvSR`ZK ch`q AZ`s`l`AM`ni etj GB t`q`f`i MtelK DcvE` msMh Kfi c`p`ij`Z  
 t`c`M`ngi e`envi 0viv AZ`s`l`m`n`R we`k- IY` Zwi KitZ cvi`eb| AZ`s`l`m`v`iY  
 ch`qi Z\_` msMh Kivi c`x`w`Z nj mviYex Kfi diskette Gi store Kfi ivL`v|

msM`px`Z Z`\_`i gva`tg M`ndKij w`p`I t`c`Z ntj KivúDUvi M`ndK`n Astk th`Z nte;  
 w`f`w`I M`ndK`n t`K`S`kj e`envi Kfi `U w`p`I, cvB w`p`I BZ`w`` c`f`Z Kiv m`e`| w`v`-U  
 e`Z`x`Z Acw`K`ij w`v` (optical disk), CD-ROM, DVD-ROM BZ`w``i mnv`th`I  
 Z\_` msi qY Kiv nq| G m`e`f`U we`v`wi Z Z\_` 00uk`qv thvM`thvM I c`h`y`00 t`Kv`  
 eBw`U`Z cvl`qv hvte|

PLEXYN uk`tivv`gi GKw KivúDUvi ubf`p t`Kv`w`s c`x`w`Z Av`Q hvi mnv`q`Zvq  
 ch`e`qY c`x`w`Z ubf`p MtelYv Kiv m`e`|

ch`e`qY c`x`w`Z ubf`p MtelYvi Z\_` KivúDUvti msi qY Kiv m`e`| wevfba`uk`qv  
 MtelK GB ai`bi KvR KivR-Kjg c`x`w`Zi weKí w`n`m`te KivúDUvti uk`-tevW`Gi  
 mnv`q`Zvq Z\_` tiKW`Kivi mv` mv` msi qY Kfi ub`PQb| Aw`I Ges w`f`w`I e`e`vi  
 gva`tg th mg`I MtelYv KvRi Askwe`kl tiKv`w` Kiv nq` tm`j`vi msi qY KvRi  
 KivúDUvi e`envi Kiv m`e`|

ᄡ Ae GwKkb

KwúDUvi Ges Ab'vb" hšcwZ Ges DcKiYi mnvqZvq Z\_ ev DcvÉ (data) msMh  
cxwZ AZ"š dj chfvte Kiv mæ| AwWI, wfwWI gva'tg th mg'lmvŋvrKvi MhY  
Kiv nq tm,tjvtK chŋYthvM" tKvW (observational code) e"envi Kti miwmi  
KwúDUvti msiŋY Kiv nq| Gi dtj cieZŋ wtkdY Aa'vq AZ"š mŋZvte Kiv  
Ptj | KwúDUvti i mnvqZvq Ab-j vBb gwUwi s Kiv Ptj | On-line monitoring is the  
process of capturing characteristics of the human-computer interaction  
automatically, in real time, from an operating system. [Rivvrbmb, 1997]

KwúDUvti i gva'tg th mg'ldwI q'vti i mnvqZvq Z\_ aŋi ivLv nq Zvi KtqKw  
D`vniY wbgŋc:

key-stroke records, audit trails, logging data, BZ"ww |

G mg'IZ\_ cŋi wfwbæmgŋq wfwbæcŋuqŋq wtkdY Kti wŋŋvtŋŋŋ e"envi Kiv  
nq|



### **cvVvÉi gj'vqb - 3**

- **mswŋB DÉi cŋæ**

1. MtelYv Z\_ msMh I msiŋY Kivi KtR wKfvte KwúDUvi e"envi Kiv mæ?
2. KwúDUvti i mnvqZvq MtelYv Z\_ msMh I msiŋY Kiv nq GiKg KtqKw  
mdwI q'vti i bvg wj Ly|



**Povšġj`iqb: BDġBU- 1**

**• msuŋB DEi cġæ**

1. Mtel Yv msuŋšġŋ i msÁvuL e`vL`v Kiab |
2. evsj v`tki cġ\_ugK ukŋŋv e`e`v m`fÜ MpxZ Mtel Yv KvŋRi m`æ`j ŋŋ` uk uk nŋZ cvti?
3. RvZiq ukŋŋv Kugkb wġcvU`cġ\_ugK ukŋŋvi tKvb tKvb w`K m`fÜ Mtel Yv Kivi ctŋŋ gZ cġġk Kti?



**Povšġj`iqb : BDġBU- 2**

**• msuŋB DEi cġæ**

1. ukŋŋv Mtel Yvi KŋqKwU , iæZcŷ`cġKvi`f` DŋŋL Kiab |
2. ukŋŋvgj-K KvŋR Rvi c Mtel Yv c`xwZ e`envi Kivi cġqvRtb cġŋvj v cġZ Kivi mgq tKvb w`tk j ŋŋ` ivLŋZ nq?
3. velqx Abŷv`b c`xwZ Ae j`æb Kti Mtel Yv KvR Kivi mgq GKRb Mtel K tKvb w`K , ŋŋvi cġZ j ŋŋ` ivLŋeb?
4. we`ij q Ges tkYxKŋŋ m`úwKZ Kvŋŋc`ŋvMx Mtel Yvi Dŋŋk` uk uk nŋZ cvti?



**Povšġj`iqb: BDġBU- 3**

**• msuŋB DEi cġæ**

1. ukŋŋv Mtel Yv cwi Pij bv Kivi we`f`æævc uk?
2. cġŋvj vi gva`tg th mvŋŋvrKvi MŋY Kiv nq ZvŋZ cġævZvi uk uk `enkó`\_vKv cġqvRb?
3. cŋeŋiKWKZ.Z\_` ukfvte GKRb Mtel K e`envi Kiŋeb?
4. DEi `vZv KZ cġKvŋi cġE Z\_` ev DcvEŋK wbfŋŋŋvM` A\_`ev AwbfŋŋŋvM` Kti ZŋŋZ cvtib?
5. cġŋvj v`Zwi Kivi mgq tKvb tKvb w`bqg tgŋb Pj ŋŋZ nq?



**Povšġj`iqb : BDġBU- 4**

**• msuŋB DEi cġæ**

1. Mtel Yv tcġŋcvRvj cġZ Kivi , iæZj KZLvb?
2. MŋU I KŋU`v± Mtel Yv c`xwZi gŋa` gj- cv\_ŋ` , ŋŋv uk?
3. cġR± tcġŋcvRvŋŋ Dŋŋk` wġ Levi mgq tKvb tKvb w`tk `wó w`ŋZ nŋe?
4. cġR±i I qvKŋŋŋU uk aiŋbi eYŋv \_vKŋŋ GKRb Mtel K w`wŋšŋŋb KvR KŋŋZ cvtib?
5. cġR± tcġŋcvRvŋŋ i /cŋŋLvi gŋa` tKvb , iæZcŷ`Ask , ŋŋv \_vŋK?
6. evsj v`tki ukŋŋv Mtel Yv msuŋšġZ\_` tKvb tKvb `vŋb cvl qv m`æ?
7. Mtel Yv m` f`ŋŋj Lb ÷vBj , iæZcŷ`ŋŋKb?



**Povšgĵvqb : BDıbu- 5**

• **msıŋB DĒi cĕœ**

1. msĥkŋi msÁv cŏvb Kiab|
2. msĥkŋvŋi cĕviŋf` wj Lly|
3. ρ Gi MmYmZK mĤ wj Lly Ges c` ,tj vi A\_ eYŋv Kiab|
4. cıvgwĭK tUŋ÷i `enkómgŋ DĵL Kiab|
5. χ² tUŋ÷i gvaġg tKvb aiĥbi Z\_ cĕvk Kiv mœe?
6. z-tU÷ KLb Ges mK cĕvŋi tŋĥĭ e`envi Kiv nq?
7. mn-múKŋŷ `tj i tŋĥĭ t nmie Kivi mgq `vaxbZv gvĭv mKfvte wbyŋ Kiĥeb?
8. F AbgvŋZ S<sub>1</sub><sup>2</sup> = S<sub>2</sub><sup>2</sup> ntj F Gi gvib KZ nte?



**Povšgĵvqb : BDıbu- 6**

• **msıŋB DĒi cĕœ**

1. MĥelYv KŋŋR KŋúDUŋi tKŋmS, mĤqKiY I cıV AbŋvÜvb KŋR, wj e`vL`v Kiab|
2. `eÁmbK MĥelYvi QK cŏZceŔ Ask, tj v mbv³ Kiab|
3. MĥelYv Z\_ msMŋ I msiŋY Kivi KŋŋR mKfvte KŋúDUvi e`envi Kiv mœe?

**mnvqK MĕcĀx**

wĥPi eB, tj v nŋZi KŋŋQ tĥtj coteb, mKŋv MĥelYv mŋmŋšĭ AĥbK aviYv I Z\_ cŋĥeb|

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### vbNE

**A**  
AcivgwiK cwi msL`vb 71

**P**  
Pz<sup>3</sup> 39

**C**  
ci vgwilK cwi msL`vb 71  
ucqvi mb (r) 57  
cR± tctcivRij 42  
ckgij v 33  
cKvi 32

**D**  
DEi  
tLvj v 33  
ubiv 0 33

**Q**  
QK (eÁmbK Mtel Yv) 90

**d**  
F-test 85

**K**  
KvBelM<sup>9</sup>U÷ 73  
tKvM/s c<sup>0</sup>uqv 88

**U**  
t-test 80

**f**  
tf`v¼ σ 85

**M**  
Mtel Yv m` f<sup>53</sup>  
MvE 39  
Mtel Yv  
Kvth<sup>0</sup>c<sup>0</sup>thvMx 17  
Rvi c 12  
vel qx Aby`vb 14

**Z**  
Z\_` ti diti wYs tKŠkj 50  
msMh tKŠkj 27

**h**  
z-test 77  
uk<sup>9</sup>iv Mtel Yv 25

**m**  
mstk- I 56  
mstk- I v¼ 61  
`faxbZivgvi 85  
mv<sup>9</sup>ivKvi  
tKŠkj 29