

Ինկյն Միտել Կր

Educational Research

EDM 1205

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Գրքի Գրքի: 1999, 2000

Գրքի Գրքի: 2001, 2004, 2005, 2006, 2010

Գրքի Գրքի: 2012

Գրքի Գրքի: 2014

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ISBN: 984-34-0047-X

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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 21st 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.

EDM 1205 তথ্য বিজ্ঞান শিক্ষণের জন্য
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শিক্ষণের জন্য

ISBN 984-34-0047-X

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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
wgułtq tdjv mæe nq Zvi Rb' wKŋKþKI tkYxKŋ wKŋY wbfP MtelYv KiþZ nq|

miKvþi i wKŋv gšYvj qþKI wKŋvbwZ cųqb I ev'evqþbi newfbæw' K wbtq MtelYvi
gva'tg tgšvj K, KvhrĪ, MhYþhvM' wmxvtšĪ tcųwtZ nq| gj'vqb KvhpĪg
cwi Pvj bvKvix ms'v (D`nvi Y: Avgvt' i t'þki ōųgva'wgK I D'P gva'wgK wKŋv tevWųų)
wbR'^KvhpĪtgi mej, `ųP w'K wPwýZ Kiv I DbwZ Avbqþbi jþŋ' cųZubqZ
MtelYv KiþZ cvtib| Avevi Dbqþkxj t'kmgþn `vZvms'vi A_°mvrvtþh' th mg'Ī
wKŋv cKĪ PvjYKiv nq tm mg'ĪcKĪĪ I wbeþnx KgRZųe,` wþRiv wKsev MtelK
wbqvtMi gva'tg cKĪĪ i newfbæAstki gj'vqb KvþRi Rb' MtelYv Ktib|

Avgiv ej þZ cwi, wKŋv c×wZ I Gi mvt_ mæúwKų th tKvb ms'v, A½ ms'vmgæ
wKŋv mæúwKų NUbvi KvhrĪviY wbyųqi Rb' th aitþi MtelYv KivR Ktib Zv meB
wKŋv MtelYvi Ašfų Ges mgq I hųMvcthvMx wKŋv e'e'v cwi Pvj bvi Rb' G aitþi
MtelYvi cųqvRbxqZv w' b w' b evotQ|

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



cvþVvĒi gj'vqb - 1

- mswŋB DEi cke
1. MtelYv mspvšĪtgštj i msÁvU e'vL'v Kiab|
 2. ōų1986 mvtj wWDB KZR.Avtgwi Kvi hųivtųų wKvþMv wktje`'vj tq j'veþiUwi
ḡ cųZųv KivþK GK Aþ_°wKŋv MtelYvi 'iaejv mæųų GB K_wUj Zvrch°
e'vL'v Kiab|

«Kv MtelYv : aviv, j q" I Dfik»

Dfik»

GB cW tkfI Avcb —

- ◆ «Kv MtelYvi aviv eYv KiZ cvi teb;
- ◆ «Kv MtelYvi j q" eYv KiZ cvi teb;
- ◆ cKvifft` «Kv MtelYvi Dfik» PwZ KiZ cvi teb Ges
- ◆ «Kv MtelYvi Dc#hMzv mbr³ KiZ cvi teb|

«Kv MtelYvi AvšR@ZKfivte `KZ.j q"mgn mgtdi mv_ µgk cwi enZ ntdqO| tMvovi w`K `eÁmbK MtelYvi c`tqcmgn «Kv MtelYvi tqfI c@qM Kiv nZ| GB mgtdi Avf`vj btk ejv nq “Science in Education Movement”; Ebiesk Ges wesk kZtK GB aitbi MtelYv RbucqZv jvf KtiwQj | Gicfi Rb WDB GK bZb aviv c@ZB Kitjb; “experimentalist and progressive educational thought” etj cwiwPZ GB aviv maviYZ «Kv, g#v%eÁmbK I `k@ kv`;m#Uxq wclq wbtq @mgmiv mgvavbgj-K@ tkSkfj i gva`tg MtelYv KivtK Drmn w`Z| 1940 Gi w`K “group dynamics movement” Gi KvifY action research ev Kvthc#hMx MtelYv MtelKt`i `w@ AvKI q Kij |

wZxq wek#xi ci Dbz wek! “re-constructionist curriculum development activity” c@j nj Ges dj k@ZtZ “action research” Avtiv Rbucq nj | GB mgq wni v Uven Zui wekleL`vZ “curriculum development project” Gi gva`tg «Kvµg cwi gvr@ I cwi ea#bi GK `eÁmbK Dcvq c@Zw@Z Kitjb| GB mgtdi action research ev Kvthc#hMx MtelYv @mgwšZ Kvthc#hMx MtelYw@ ev cooperative action research bvtg cwiwPZ|

Avgiv hw` cKwZ. Abyviti «Kv MtelYvi avivtK wPwZ KiZ PwB Zte f`Le Gi gta` itqfQ gj-Z –

- «Kv_@K ch#e qY Kiv gj-K aviv
- bZb avivi «Kv ev AMWgx Avf`vj #bi aviv (GLv#b weÁv#bi tPtq `k@tK Ges Rxe#bi AwfÁZv#K cixq#Yi tPtq tewk , iazit`lqv nZ|)
- weÁv#w#EK MtelYvi aviv
- gvbeag#MtelYvi aviv; 1960 Gi cieZ#mgtdq GB aviv c@avb` cvq|

[AvM@x «Kv_@, John P Keeves m#Uw`Z “Educational Research; Methodology; And Measurement : An International Handbook (gyfY Pergamon) eBwU cotZ cvfib|]

ᄡ Ae GWKkb

Gevi Avgiv j ᄡ Kie evsj vt`tki ᄡᄡᄡ e`e`vi DbᄡZKᄡr th aiᄡbi MᄡelYv Kiv cᄡᄡRb Zvi j ᄡ ᄡK cᄡᄡZi nᄡZ cvᄡi | cᄡᄡᄡ ᄡᄡi ᄡᄡᄡ e`e`vi Rb` cᄡᄡRbᄡq MᄡelYvi j ᄡ ᄡᄡᄡc nᄡZ cvᄡi –

- Aóg tkYx chᄡᄡ cᄡᄡᄡ ᄡᄡi ᄡᄡᄡ e`e`vi DbᄡZKᄡiYi DcᄡᄡMᄡZv hᄡPvB |
- eZᄡᄡ Av_ᄡᄡᄡRK e`e`vq AᄡᄡᄡK mgvR KZᄡ. Aóg tkYx chᄡᄡ cᄡᄡᄡ ᄡᄡi eva`Zᄡᄡj-K Kivi DcᄡᄡMᄡZv I AᄡᄡᄡK ᄡᄡᄡ e`e`vi MᄡYᄡᄡZv ᄡᄡᄡ Kiv |
- cᄡᄡᄡ ᄡᄡi ᄡᄡᄡ ᄡᄡᄡᄡᄡᄡ RᄡᄡᄡZv ᄡᄡᄡᄡ Kiv |
BZ`ᄡ |

gva`ᄡᄡ ᄡᄡi Rb` cᄡᄡRbᄡq MᄡelYvi eᄡᄡea j ᄡᄡi gᄡa` Kᄡᄡᄡ D`vniY ᄡᄡᄡc nᄡZ cvᄡi –

- gva`ᄡᄡ ᄡᄡᄡ Kivᄡᄡ Zv hᄡPvB |
- tkYxKᄡ ᄡᄡᄡ-ᄡᄡᄡ e`envi mᄡᄡZv ᄡᄡᄡᄡ |
- gᄡ`vqᄡ cᄡᄡZ Kᄡᄡᄡᄡᄡᄡ mej I `ᄡᄡ ᄡᄡ ᄡᄡᄡ |

D`P ᄡᄡᄡ ᄡᄡi GKᄡᄡ j ᄡ ᄡᄡᄡc nᄡZ cvᄡi –

- temi Kᄡᄡ ᄡᄡᄡ`vj q mgᄡᄡi ᄡᄡᄡᄡᄡ AvᄡᄡZK gᄡᄡ hᄡPvB |

MᄡelYvi cᄡᄡ j ᄡ nj Ggb ᄡᄡᄡ bZᄡ ᄡᄡZ`i Aᄡᄡᄡ GLbᄡ chᄡᄡ hᄡᄡ ᄡᄡᄡ cvᄡ ᄡᄡᄡᄡᄡ

ᄡᄡᄡ MᄡelYvi Kᄡᄡᄡ mᄡᄡᄡᄡ Dᄡᄡᄡ ᄡᄡᄡc nᄡZ cvᄡi –

- ᄡᄡᄡ NUbᄡ ev ᄡᄡᄡᄡ ᄡᄡᄡᄡᄡᄡ j vᄡ; D`vniY - gva`ᄡᄡ chᄡᄡ ᄡᄡᄡᄡᄡᄡ ᄡᄡᄡᄡ ᄡᄡᄡᄡ Aa`qᄡ KᄡᄡR Mᄡᄡ Ges knᄡᄡi ᄡᄡᄡᄡᄡ ᄡᄡᄡᄡ I Aᄡᄡᄡᄡᄡᄡ Zᄡᄡᄡj-K MᄡelYv | GB cᄡᄡᄡi MᄡelYᄡᄡ Avgiv Abᄡᄡᄡᄡᄡ ev investigative MᄡelYv ej |
- beg tkYᄡZ `beᄡᄡᄡᄡ ᄡᄡᄡ MᄡYKᄡᄡᄡ ᄡᄡᄡ ᄡᄡᄡᄡᄡ ᄡᄡᄡ ᄡᄡᄡ ᄡᄡᄡᄡᄡ ᄡᄡᄡᄡᄡᄡ ᄡᄡᄡᄡ ᄡᄡᄡᄡᄡᄡᄡ - GB NUbᄡᄡ evsj vt`tki kᄡᄡi ᄡᄡ`vj q, ᄡᄡᄡ GKᄡᄡ cᄡᄡᄡZ NUbᄡ ev Pj | ᄡᄡᄡ MᄡelK GB AbᄡᄡZ ᄡᄡᄡᄡᄡᄡ hᄡPvB Kᄡᄡ AvMᄡᄡ nᄡZ cvᄡi | GB aiᄡbi Pj Gi Kivᄡᄡᄡᄡ ᄡᄡᄡᄡᄡᄡ AbᄡᄡZ ᄡᄡᄡᄡᄡᄡ hᄡPvB ᄡᄡᄡᄡᄡ MᄡelYᄡᄡ ej v nq ᄡᄡAbᄡᄡZ ᄡᄡᄡᄡᄡᄡ hᄡPvBᄡᄡ ev hypothesis testing cᄡᄡZi MᄡelYv |

- tKvb NUbv KZevi NUtQ Ges Ab` tKvb NUbv ev KviYi mvt_ c0guU m`uKv` Kbv Zv LjR tei Kiv - GB ai`bi Mtel YvK j`YI ubi`cK ev diagnostic Mtel Yv ej v nq|

GB cvtV evsj v`tki Pj gvb uk`v e`e`vi cwi`c0j`Z uk`v Mtel Yvi j`YI I Df`k` uk` ai`bi ntZ cvti Zv ubtq AvtjvPbv Kiv nj | cvtVi tk`l Avgiv t`tL tbB uk`v Mtel Yvi Dc`hwmZv, djvdj ev outcome uk` ai`bi ntZ cvti | uk`v Mtel K miP (Rich) Gi g`Z uk`v Mtel Yvi DcKiYMZ Ges fveMZ Dfq cKv`ii Dc`hwmZv _vK`Z cvti |

Ab` GKRb Mtel K d`vbr (Fulana) etj`Qb - gj-Z `B cKv`i Mtel Yij ä djvdj uk`v t`j`i e`üZ ntZ cvti | c0g cKv`i Mtel Yij ä Ávb tKvb GKU mgm`vi t`j`i c0qM Kiv nq Ges c`i Gi mgv`bi gva`tg c0B Ávb cieZ`Z mavi YxKiY Kiv nq | wZxq cKv`i c0B Ávb nj cumulative Ávb Ges GB Áv`bi Dci w`E K`i c`t`c w`i Kiv nq | Aek` ZZxq GKU cKv`i f`I eZ`v`b Rbuc`y ntq DVtQ | Gi gva`tg Mtel Yij ä djvdj mimmi we`ij q, tk`YxK`j` uk`sev uk`v`f` Mv cwi`t`ki Dci c0qM Kiv nq |

uk`v t`j`i m`½ m`uK`Z we`lqe` ubtq Mtel Yv we`k`i Db`Z t`kmg`n ht`ó Rbuc`y Zv j`vf Ki`j` I evsj v`k AvRI GB`j`i` A`bK w`c0tq AvtQ |

GKU K_v g`b ivL`Z nte, uk`v Mtel Yv I mgvR Mtel Yv i`agn` AZxZ I eZ`v`b e`e`vi c0Z j`YI` bv ti`L fwe`l`zi w`tK` w` ubex K`i cwi`Pj`bv Ki`Z nte | Kvi Y mgm`v D`Z nI qvi c`eB h` Mtel Yvi gva`tg m`e` mgm`v w`Pv`Z Kiv m`e` nq Z`e Zv`Z A`bK Ac`w`ZKi cwi`w`Z Gov`bv m`e` nte |



cvtVv`Ei gj`vqb - 2

- **msv`j`B D`Ei c`k`e**
 1. uk`v Mtel Yvi Avw` weeZ`B eY`v Ki`ab |
 2. evsj v`tki c0`ugK uk`v e`e`v m`f`U MvxZ Mtel Yv Kv`Ri m`e` j`YI` uk` ntZ cvti ?
 3. Av`R`w`ZK`f`v`e` t`KZ uk`v Mtel Yvi avi vmgn` eY`v Ki`ab |

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 cxwZ, uk`qvi wefbae`ti AcPq, uk`qv-A_0wZ, 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`mg, ubt`Rbv I civgk`vb, cvW`cyK uk`qv DcKiY BZ`w`i AM0aKvi wfiE`tZ MtelYv KvR MtelKtK DrmwvZ KitZ nte|00

00uk`qv c0Z0vbmgt`n G`Kkb wimvP`ev c0qvMg`x MtelYvi Dci wekl , iaZj Avtivc Kiv Ges MtelYvi djvdj tK cI-cwI Kv, tckvMZ mfv, Avtj vPbv BZ`w`i gva`tg h_vh_fi`te c0vi Kiv c0qvRb|00

cieZ`meKquw wicvtUB c0q GKB aitbi mzwik itqtQ|

Geri Avgiv ev`e cwi w`wzi gj`Lvgy ne|

t`tki th Kquw miKvix uk`qK-c0k`qY gnwe`ij q Gg GW t0M0g cwi Pvj bv Kti tm,tjvtZ MtelYv`tji uk`qv`e,` c0Z`tKB GKiu wekl w`K Ae j`tb uk`Qy MtelYvag` KvR m`ubaeKti dissertation AvKvfi djvdj I mzwik c0Z Ktib| RvZxq c0Bgvix uk`qv GKv`Wgx, XvKv wekte`ij tqi uk`qv MtelYv Bw`w`UDU BZ`w` c0Z0v`bI uk`QyMtelYv KvR Kiv nq| Drmwv uk`qv-MtelKe,` wR`^Df`v`MI uk`Qy MtelYv KvR cwi Pvj bv Ktib|

Dbz I Ab`vb` Dbqbkxj t`kmg`ni mt` Avgit`i t`tk cwi Pwv Z 00uk`qv MtelYv00 KvRi gj- cv`R` nj abstract mslMhceR gyY Kti Avgit`i MtelYv KvRi tKvb `vqx tiKW`ivLv n`Q bv, tKvb KvRwI tKvb c0k`wzi Zv wba`fY Kiv n`Qbv, c0vi Kiv n`Q bv| tg`wv K MtelYv KvRi djvdj uk`qv e`e`vi tg`wv K Dbqtb , iaZcY` Ae`vb ivL`tZ cvfi w`K tZgub c0qvMgj-K th mg`l wev`QbaKvR n`Q tm,tjvi mzwik cieZ`Z GKB aitbi c0Z0v`bI uk`qv e`e`vi Dbqbkf` ev`evqb Kivi e`e`v MhY Kij t`kxq uk`qv e`e`v DbzZi nte; mziwv Gw`tK Avgit`i mevi `w0 t`I qv DvPZ|



cv`VvEi gj`vqb- 3

• msw`fB DEi c0ae

1. RvZxq uk`qv Kugkb wicvtU`c0`wgK uk`qv m`0xq w`K aitbi MtelYv c0Z0vi mzwik wQj ?
2. RvZxq uk`qv Kugkb wicvtU`c0`wgK uk`qv tKvb tKvb w`K m`fU MtelYv Kivi c`qI gZ c0k`v Kti?

figKv

ukŕŕv eZŕvb Z_ cŕny³ i hŕM cŕZ²K ivó³ Ges cŕZ²K bvMwiťKi Rb² GK , iaZcY[©]
figKvq AeZxY[©] AvbŕvnbK I DcŕvŕvnbK Dfq cKvi ukŕŕvťŕťĪ ukŕŕvne², ukŕŕv
gťbweÁvbx weŕfbaw² ŕKi ŕťgvbŕZi jťŕŕ² MtelYv KvR cwi Pij bv Kťi _vťKb|

Zte MtelYvi mgqKvj, A_ cŕŕB I tjvKej Ges mteŕcwi DťĪťk²i cŕZ jŕŕ² tiťL
MtelKMY weŕfbæcKvi cŕŕij Z cŕvZi ga² nťZ Dchŕ³ cŕvZŕU teťQ tbb| GB
BDubťU ukŕŕv MtelYvi cŕŕij Z I Rbŕcŕ KťqKŕU cŕvZ 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` mbr³ 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`lvU`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`KuzK ve`Avb, `Re ve`Avb, c`hiv, c`KSkj met`q`ti ZExq fivavivi 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 Sk`tQ/ c`Z`K Db`qbkxj t`k Zvi vbr`^ Av`v`v`RK Ae`vi Dci vbf` Kti uk`qv e`e`vi vevf`v`v` K Db`qbk`i Ri`ax vfu`E`Z vevf`v`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`v` fivM KitZ cwi /

- Huz`v`v`v` (historical)
- Db`qbag` (developmental)

ᄡ 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 AbjviY bv Kti cŋqvRbtevtā GKwaK tKŠkj e'envi KiťZ Dť`vMx nb| cxwZ ev methodologywKŋv Mtel Yvi tŋťĀ `BwU tgiāi gta` Ae`vb KiťQ - tKŠkj Ges `e'ÁwbK `kŋ| m'úúZKKvtj t`Lv tMťQ wKŋv Mtel KMY wKfvte 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'ťŮ wKQymvaviY Z` tcjvg| cieZP cvw_ťj vťZ KťqKwU cxwZ, tKŠkj wbtq Avťj vPbv_vKte|



cvťVvĒi gj`vqb- 1

• msŋŋB DĒi cĳæ

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?

Rnic Mtel Yv

Dfik`

GB civ tk`I Avcb —

- ◆ uk`Ivg~j K Kv`R Rnic Mtel Yv cxwZ c`qM e`vL`v Ki`Z cvi`teb|

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

Rnic K`wUj mvt` maviY RbMY RbmsL`v Rnic ev fvg 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 cwi`w`Z`Z Rnic Mtel Yv cxwZ e`envi Kiv Pij | th tKvb Mtel Yv Kv`Ri gZ Rnic cxwZ`Z j`I` w`i Ki`Z nq c`q|

Rnic Mtel Yvq `BwU gj- c`qM e`envi Kiv nq| GB `BwU nt`Q wbeo miv`Iv`Kvi ev intensive interview Ges`ugew`Z cwi`g`R`B ev progressive modification w`Z`xq c`qM e`envi Kij` GKB mg`q c`qM e`envi Kiv m`e|

Rnic Mtel Yvq c`k`g`j v c`Z`K`i`Y ce`B AZ`S`i`a`z`c`Y`P

Avgiv Gevi t`wL Rnic Mtel Yv Kv`R uk`fv`te AM`hi nt`Z nq| c`q`g Rnic Kv`wUj gj- j`I` w`i Ki`Z nq, Gici j`I` j` uba`I`Y Ki`Z nq| j`I` t`ji tKvb c`Z`w`a`Z`k`j Ask bglv wnt`mte w`P`y`Z Kiv Avek`K Zv uba`I`Y Ki`Z nq| Gici c`k`g`j vi gra`tg Mtel Yvi Dcv`E mSM`h Ki`Z PvB`j AZ`S`i`a`z`j mnKv`ti c`k`g`j v c`Z` Ki`Z nte| c`k`g`j v c`Z` Kivi ci Gi`T`wU w`P`z`Z L`j`R tei Ki`Z nq| Gici c`k`g`j v hviv gv`V ch`q e`envi Ki`teb`m`Bme gv`V Kg`i`i ubePb KvR m`u`be Kti c`q`R`bxq c`k`I`Y w`Z` nq| gv`V ch`q KvR`i`i`æ`nj tK``ie`j`Z th Mtel K``j Ae`vb Ktib Zv`i KvR nj gv`V Kg`i`i KvR AZ`S`i`a`z`j m`y`fv`te AweiZ c`q`M`q ch`e`I`Y Kiv| gv`V ch`q`i KvR tkl Kti Kg`j`j w`d`ti Avmtj raw data ev c`q`M`K`fv`te c`B Dcv`E tk`Y`x` Kivi gra`tg dj`vdj` tei Kivi ce`i`æ`nq|

Rnic Mtel Yv Kv`Ri Rb` c`k`g`j v `Zwi Kivi mgq`wK ai`tbi mZK`Zv Aej`b Ki`Z nq Zv t`Le Gevi |

- D`Ei`v`Zvi Kv`Q th mg`-`I`k`a` Acwi`w`P`Z gtb nt`Z cvti` tm`j`v e`envi bv Kiv|
- t`b`w`Zev`PK k`a` ev avi Yv Dc`v`cb bv Kiv|
- GKwU c`k`k`AZ`w`a`K Z`-` enbKvi`x` k`t`ai` mgv`tek bv NUv`bv|

gj tKŠkj

welqx Abyv̄b c×wZi gj tKŠkj nj chʼeŋtʼyi gvaʼtg cŋqvRbxq Z_ msMh̄ Kiv| chʼeŋY Avevi ḡ aiṭbi nʼZ cv̄ti- AskMh̄Ygj-K Ges AskMh̄Y eʼwZtʼiK| AskMh̄Ygj-K chʼeŋtʼyi tʼŋtʼ chʼeŋK wṭRB j ŋYxq BDibU ev ḡtʼi mvt_ wgtk hvb wKŠ AskMh̄Y eʼwZtʼiK tKŠkj hLb Aejaḡb Kiv nq ZLb MʼelK ḡjMZ Kivh̄v̄j x t_ tK ḡtʼi Aeṭvb Ktʼi mʼfite chʼeŋY Ktʼib|

AskMh̄Ygj-K chʼeŋY c×wZtʼZ wKfite KivR Kiv nq?

- cĉĀw mʼtŪ GKw Lmov msĀv ḡZix Kiv nq;
- GKw Kiv wK (hypothetical) eʼvLṭv cŪZ KitʼZ nq;
- MpxZ cĉtĀi Avtʼj vʼtK GKw welq wṭtq KivR iia Kiv nq I GB KivRi gvaʼtg h̄vPvB Kiv nq th MpxZ cĉĀw GB tʼŋtʼ mZ NUbvi mvt_ Lvc LvʼQ wK bv;
- cĉĀ Lvc LvʼQ bv G iKg Aeṭv t_ Lv tMʼj cĉĀ Ges Kiv wK eʼvLṭv ḡw̄i GKw tK cʼmʼv̄b Kiv nq h̄vʼZ Ktʼi ciwŋZ welq w̄ eivZ nq;
- cĉĀ Mh̄Y, welq ciwŋY, cĉĀ cʼmʼv̄b KivR w̄ Pj tʼZ vʼtK hZŋY chʼšGB ḡw̄i gta GKw meRv̄j ḡKZ.mʼúKᶜ vcb Kiv mʼe nq|

welqx Abyv̄b c×wZ Aejaḡb MʼelYv Kivi mgq MʼelKtK th mgḡw̄ tK tLqv̄ ivLʼZ nq tm, tʼjv nʼQ –

- AZḡševṭēZvi mvt_ cŋwK aviYv t_ tK Kivh̄i bKkv cŪZ Kiv;
- MʼelK w̄tʼmte wK aiṭbi GKvʼw̄gK ŋwZ nevi mʼv̄ebv AvʼQ Zv chʼeŋY Kiv;
- tKvb aiṭbi eRṭh̄w̄m̄ w̄Pšf̄ f̄iebv djvdtʼj i mvt_ mʼú, nʼZ cv̄ti tm mʼtŪ mʼPZb vKv;
- MʼelYv KivR w̄i Rbḡ Dchṡ ṭvb LjR tei Kiv;
- th̄w̄Zi Z_ cŋvbKiv tK LjR tei Kiv;
- chʼeŋtʼyi m̄gv̄w̄RK cwi tek mʼtŪ mʼPZb vKv;
- Z_, cŋvY BZḡw̄ wKfite ti KWᶜKiv nte tm mʼtŪ m̄yúó cwi Kíbv ḡwi Kiv;
- Z_ tkYxexKiY mʼtŪ ṭúó w̄m̄v̄šf̄Mh̄Y Kiv;
- aviYv nʼZ Kivᶜmʼúvḡ b chʼšf̄ tKvb gaḡeZᶜ chʼq KZUKzmgq j w̄Mte Zv w̄baŋY Kiv;
- w̄tʼcv̄t̄ tKvb cwi w̄wZtʼZ tKvb aiṭbi ḡkʼKi m̄v̄t̄b cKvK Kiv nte Zv w̄baŋY Kiv|

welqx Abyv̄tʼbi gvaʼtg GKRb MʼelK GKw gj-ZĒ; ṭcb KitʼZ cv̄tib|

welqx Abgy'ib cxiZtZ KivR Kivi Rb` wZb cKvi bgbyqb Kiv nq-

quota sampling, snowball sampling Ges search for exception.

tKivUv bgbyqtb MtelK cxiZU wfbam=ú0vq nZ KtqKRbtK wePZ Ktib| Ztvi ej
bgbyqtb GKU wekl NUbv tiKW'Kti μgrštq Abj/c Avtiv NUbv tLVRv nq| wekl
NUbvi Abgy'ib bgbyqtb KivRi cA-tK fž cgyYZ Kiv nq ev GKU cwienZ
ifc c0vb Kiv nq|

welqx Abgy'itbi gva'tg tKiv wekl tkYxi tKiv Aeva` wKv_# AvPiY chfe'Y
Kiv, wekl wKv'Kti tkYK' chfe'Y Kiv, tKiv wcuQtq cov wekl wKv_# tKiv
wekl welq Abgy'itbi AvMh wby' Kiv BZ'w` KivR Kiv mae|

welqx Abgy'ib cxiZtZ c0B MtelYv djvdtj i`KwZ. tctZ ntj MtelKtK KZ, tjv
w`tK mvearbZv Aej ab KiZ nte, thgb -

- Z` msMh tKskj e'vL'v KiZ nte|
- msMpxZ Z` wictvU'c0k0 KiZ nte Ges th tKiv mgq cYtwek- IY
thvM' Ae'vq msi'Y KiZ nte|
- FYvZK D`vniYmg'ni D'jL_vKte wictvU'
- gv ch'qi KivRi wekl Y wictvU'AvKivti wj wceX KiZ nte|
- Abgy'ib Ges cgyYgj-K KivRi ga'Kvi m'úK'wby' KiZ nte|
- c0'wgK Ges gva'wgK Zt`i gta' cv_R' wby' KiZ nte mif_ mif_ eY'v I
e'vL'vi gta'I cv_R' Ztj aitZ nte|
- cKZ.KivRi weiy Wtqi xi gva'tg msi'Y KiZ nte|
- Zt`i DrKI'v thb wqš'Y Kiv mae nq tmw`tK tLqj i'vL'tZ nte|



cvtVvEi gj'iqb- 3

- msM'jB DEi ckae
 1. welqx Abgy'ib cxiZi cKvif' wj L'j|
 2. AskMhYgj-K chfe'Y cxiZtZ GKRB wKv' MtelK wK c0'qvq KivR
Ktib?
 3. welqx Abgy'ib cxiZ Aej ab Kti MtelYv KivR Kivi mgq GKRB MtelK
tKiv w`K, tjvi c0Z j' i'vL'teb?
 4. welqx Abgy'ib gva'tg MtelYv KivR cwipj'v Kivi mgq MtelK wK ai'tbi
mvearbZv Aej ab Ki'teb?

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 thšw³KZv e^vL^v KiḡZ cviḡeb Ges
- ◆ Kvthc̣thvMx Mtel Yvi ^ˆenkó mbr³ KiḡZ cviḡeb|

Kvthc̣thvMx Mtel Yv ev action research c̣Pij Z Mtel Yv c̣xwZ, ḡj vi ḡta eZḡvḡb AZ^ˆšl Rbuc̣ḡ| GB aiḡYi Mtel Yv tḳb ubw^ˆómgq mḡvi ḡta D^mZ tḳv GKwU mḡm^vi KṿhRi mḡvavb LḡR tei Kivi Rb^ˆ GK AvavbK c̣ḡuqv| Kvthc̣thvMx Mtel Yv c̣w^vw^vZ ẉbFḡkxj, A^ˆḡ tḳv GKwU ẉtkl c̣w^vw^vZ ev aviYi ḡta tḳv GKwU mḡm^vi mbr³ Kḡi GKB c̣w^vw^vZi ḡta mḡm^vUⁱ mḡvavb LḡR tei Kiv nq GLvḡb| G aiḡbi Mtel Yv mnḡhM^Zvi ḡvaḡḡ m^vubæKiv nq, GK^ˆj MtelK Ges ẉtklÁ ev practitioner GKm^vḡ GKwU Kvthc̣thvMx Mtel Yvq AskM̄Y Kḡib Ges Zviv ẉbḡRivB GwU c̣w^vḡj bvi fvi M̄Y Kḡib|

Kvthc̣thvMx Mtel Yvi msÁv Avḡiv ẉḡḡc̣ ẉḡZ c̣w^v –

ẉeL^vZ ẉkḡẉe^ˆ 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^ˆḡ tckvq ẉbḡq^mRZ ẉkḡḡK hLb ẉkḡḡv m^vÜxq Zḡḡji m^vḡ^ˆ ẉbR^ˆ tckv^vf^vḡEK KvḡRi m^vúK^ˆLḡR tei KiḡZ AvM̄x nb ZLb ẉZẉb action research ev Kvthc̣thvMx Mtel Yvq ẉbḡq^mRZ 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 ẉkḡḡv DcKiḡYi ḡta GKx^vZ Kiv m^vḡ Ges Gi dḡj c̣ḡqvḡMi tḡḡḡK ZvrḡẉYKf^vḡe Dbḡ^ˆ Kiv m^vḡ 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^ˆB ḡj MZ ev mnvqZvi ḡvaḡḡ KiḡZ nḡe|

Kvthrc̥thvMx MtelYv I eʻenwi K MtelYvi gtaʻ ʻvǵ I cvᚲ Rʻ tKvᚲvq?

- Dfqb ʻeÁmbK MtelYvi aviv AbmiY Kti |
- eʻenwi K MtelYv ZĒmgn̄ cixŋlv̄ Kti Ges mʻúKᚲᚲᚲcb Kti etj Gi kZmgn̄ tek Kivb cKwZi mʻzi vs eʻenwi K MtelYvi tŋtĪ Awak msLʻK tKm ev tǵšvj K Dcvᚲ vb chŋeŋY Kiv nq |
- Kvthrc̥thvMx MtelYv ʻeÁmbK MtelYv cᚻwZi aviv AbmiY Kiti | AZʻšl bgbxq gvĪvq Zv eʻenwi Kti | KviY Gi gj- DfĪkʻ nj GKwU wtkl̄ cwiwᚲZtZ GKwU gvĪ wtkl̄ mgmʻvi mgvaib LjR̄ tei Kiv | eʻenwi K MtelYvq th mgᚲkZᚲᚲᚲᚲ Pjv nq Zvi Awakvsk̄ wkwj Kti cŋqvm̄ Kiv nq Kvthrc̥thvMx MtelYvi tŋtĪ |

DfĪkʻ

wʻvj q Ges tkYxKŋ mʻúwKZ Kvthrc̥thvMx MtelYv maviYZ vbtʻ DfĪkʻ mgfai wfvĒtZ cwiPvj Z nq –

- tKvb wtkl̄ cwiwᚲZtZ mbrʻKZ.tKvb mgmʻvi mgvaib LjR̄ tei Kiv;
- PvkxiZ wŋŋKtʻi tKvb bZb ʻŋZv I cᚻwZ mʻtŪ aviYv ARᚲ Kivi tŋtĪ;
- tKvb Pj gvb eʻeᚲvq tKvb AvavbK ev bZb tKvb Awak msthvRb Kivi cŋqvRbxqZv tᚲLv wʻtj ;
- tkYxKŋ wŋŋK Ges GKvŋwŋK MtelʻKi gtaʻ mʻúKᚲᚲᚲᚲᚲᚲbi cŋqvRb tᚲLv wʻtj GB cᚻwZtZ MtelYv Kiv hvq;
- tkYxKŋ mʻúxq tKvb mgmʻv mgvaibgj-K aviYv ev ZĒj wkvŋki cŋqvRbxqZv tᚲLv wʻtj |

tK ev Kiv MtelYv Kiŋeb?

Kvthrc̥thvMx MtelYv GKKfvte, ʻjMZ fvte Ges cwiᚲwi K mnthvMZv ev collaboration Gi wfvĒtZ Kiv mʻe |

Kvthrc̥thvMx MtelYv cāvZ chŋeŋY Ges AvPiY ev ʻfvemZ Dcvᚲ eʻenwi Kti |

tKvb GKwU MtelYv KivR hLb Kvthrc̥thvMx cᚻwZtZ cwiPvj bv Kiv nq ZLb Zʻ msMᚲ Kiv Ges mvgwM̄K wfvĒtZ Zv eʻenwi Kiv nq, Zʻ aviY Kiv nq; gj- vqb Kiv nq | wv ʻᚲ mgqm̄gvi gtaʻ Gi AMwZ mʻtŪ Avtj vPbv Kiv nq cŋqvRbteŋta AMwZ ZjwšZ Kivi Rbʻ bZb aiŋbi tKškj msthvRb Kiv nq |

mvgieᚻZv

Kvthrc̥thvMx MtelYvi bgbxq ʻewktóʻi Rbʻ AŋbK MtelK GfK tKvb tǵšvj K MtelYv cᚻwZ etj ʻŋKvi KitiZ Piv bv |

c`ŷqV Mi tŷŷŷmgn

wbŷgwe³ tŷŷŷmgn KvtŷŷcŷŷvMx Mŷel Yv c×wZi gva`tg wkŷŷv m=ŷŷq weŷŷqi Mŷel Yv Kiv nq –

- wkŷŷY c×wZ – A_ŷ c²vMZ c×wZi cwieŷZŷŷw` tKvb wkŷŷK tKvb GK Awfŷbe c×wZ e`envi KiŷZ Pvb|
- wkLb tKŷkj – thgb GKK weŷŷqŷŷŷEK wkLb Ges mŷgŷMŷK cvV`mŷP Aeŷ ŷŷb wkLb Gi gŷa` tKvbŷU DĚg Zv tei Kiv|
- gj`vqb tKŷkj – tKvb wkŷŷK hŷ Zvi MvŷŷK gj`vqb Dbz KiŷZ Pvb Zŷe ZvŷK GB Mŷel Yv c×wZ wŷŷP nŷZ nŷe|

Mŷel Yv cwi Pvj bvi c`ŷŷcmgn wbgŷc –

mgn`v mŷv³KiY, Mŷel Yv Kivi KvtR AvMŷx e`w³ ev `jmgŷni ga`Kvi cŷwŷK Avŷj vPbv, ZZŷq chŷŷq cŷŷŷRbŷŷŷa cŷŷŷKZ GKB aiŷbi Mŷel Yv KivR chŷŷj vPbv Kiv, PZZ`chŷŷq cŷŷŷKZ KvtRi Avŷj vŷK cŷŷŷRbŷŷŷa cŷŷŷ mgn`v bZb AvŷŷŷK Zŷj aiv Gi cŷi chŷŷq Mŷel Yv tKŷkj wŷŷŷ Y Kiv nq Gi gŷa` iŷŷŷŷ bŷŷvqb I Mŷel Yv cwi Pvj bv e`e`v A_ŷŷb, m`m`ŷ i cŷŷŷY cŷŷb, Gi cieZŷchŷŷq gj`vqb Kjv tKŷkj w`i Kiv nq| mŷŷg chŷŷq cŷŷŷ Kvhŷi Kiv nq|

meŷŷŷi cŷŷ Z` ev DcvĚ weŷŷŷ Y Kiv nq, wŷŷŷŷŷ Mŷŷ Y Kiv nq, Ges GKB mŷŷ Mŷel Yv cŷŷŷŷŷi mŷŷK gj`vqb Kiv nq| GB mgŷŷ t`Lv nq wk aiŷbi fŷ ŷŷŷŷ nŷŷŷŷ, wk aiŷbi mgn`vi D`ŷ nŷŷŷŷ |

KvtŷŷcŷŷvMx Mŷel Yv c×wZ BDŷivc I Avŷŷŷ Kvi wkŷŷŷZbmgŷŷ hŷ_ó RbŷŷŷZv ARŷ Kŷŷŷŷ| eisj v`ŷk weŷŷŷe wkŷŷv Kŷŷkb wŷŷŷŷŷ we`vjŷŷŷi wkŷŷŷŷi KvtŷŷcŷŷvMx Mŷel Yv Kivi mŷŷŷŷ _vKŷŷ I GB aviYv ev`ŷŷŷŷŷŷ tŷŷŷŷŷ RbŷŷŷZv jvŷ Kŷŷi bvB|



cŷŷŷŷŷi gj`vqb - 4

- mŷŷŷŷŷ DĚi cŷŷŷ
 1. KvtŷŷcŷŷvMx Mŷel Yvi gŷa` wk aiŷbi `eŷŷó` _vKv DŷPZ?
 2. wkŷŷv e`e`vi mŷŷŷ mŷŷŷŷŷ tKvb tŷŷŷŷŷ wk aiŷbi KvtŷŷcŷŷvMx Mŷel Yv nŷZ cŷŷŷi?
 3. we`vjŷŷŷ Ges tŷŷŷŷŷŷŷ mŷŷŷŷŷŷ KvtŷŷcŷŷvMx Mŷel Yvi Dŷŷŷŷ` wk wk nŷZ cŷŷŷi?

cW 1

ukŷiv MtelYiv : avcmgn

Dfiik

GB cW tkfi Avciab —

- ◆ ukŷiv MtelYivi avcmgn mbv³ KiŷZ cviŷeb;
- ◆ ukŷiv MtelYivi Askmgfni , iaŷje`vL`v KiŷZ cviŷeb Ges
- ◆ ukŷivŷŷfi miŷ_ m`uukŷ MtelYivi m`e` mgm`vgj-K ev`e D`vniY Dc`vcb KiŷZ cviŷeb|

cŭg BDibŷU Avgiv t`fLwQ th, AvaybK RMŷZ ukŷivi weifbæw`K mspvŷŷ MtelYiv
µgk AZ`ŷŷ , iaŷcŷ`vb `Lj KfiŷQ| GKB BDibŷUi weifbæcviŷV Avgiv ukŷiv
MtelYivi j`ŷŷ, Dfiik` I cŷvif` ŷbtqI Avŷj vPbv tctqiwQ|

eZŷvb BDibŷUi cŭg cviŷV Avgiv ukŷiv MtelYivi weifbæAsk ŷbtq msvŷŷB Avŷj vPbv
Kie|

Ab`vb` th tKivb cŷwzi MtelYivi b`vq ukŷiv MtelYivi c`wZ ,tjvi gfa` ŷbtgæ³
Ask ,tjv mshŷ` _vŷK:

- mgm`v vPvŷZKiY
- mgm`vi msAv cŭvb
- MtelŷKi ceeZŷ AvfAZvi vfiEŷZ mgm`v m`uukŷ GKwU Kivhŷi
(AbygZ) wvŷŷŷMŷ
- MtelYivi Rb` cŷqvRbxq tools ev nmwZqvi ev DcKiY mbv³KiY
- DcKiY tools ev nmwZqvi cŷZKiY I Gi mivvth` cŷqvRbxq I
ŷbfŷŷhvM` Z` msMŷ Kiv
- msMŷxZ Z` web`vm I tkŷxe×KiY
- AbygZ wvŷŷŷŷ vfiEŷZ Z` weŷkdYKiY|

Gictii c`ŷŷc ,tjv AZ`ŷŷ , iaŷcŷŷ

Z` weŷkdY Kiv tkl ntq tMŷj AvbgvmbK th wvŷŷŷŷ Mŷŷ Kiv ntqiwQj tmwU
thŷŷ³KZv hvPvB KiŷZ nŷe| hvPvB cŷeŷ ci Gi MŷŷthvM`Zv t`Lv w`ŷj wvŷŷŷŷ
MŷxZ nŷe| Ab`_vq GwUŷK GŷKevŷi eRŷ KiŷZ nŷe wKsev t`LŷZ nŷe mŷŷkvab Kiv
m`e wKbv| wvŷŷŷŷ mŷŷkvab Kiv m`e nŷj bZbŷvŷe wvŷŷŷŷ wj LŷZ nŷe Ges Zvi
vfiEŷZ Avevi Z` msMŷ chŷŷq wdŷi thŷZ nŷe| A`ŷ bZbŷvŷe cixŷŷwU iiaKiŷZ
nŷe|

ġ Ae GWKKb

MtelYv KtR th cġgjjv e'euZ nq Zv mvariYZ ubtgr³ wZbuU Abgytbi Dci wfwE
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^uY^mZZvi mvt_ DEi cġvtb m^sZ|

Avgiv hw` Dctii Avtj vPbv t_ tK , iazcY^oAskUKZZtj atZ Pvb Zvntj eje
wġġv MtelYv KvR cui Pvj bv Kivi Rb` th mg`c` tġc ubtZ 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 tkYxKtġ covtZ MġvĀtj i weÁvb wġġKt` i Amyeav nt`Q|]

- GB mgm`wU tK msÁwqZ KitZ nte MtelKtK|

[D`vniY: MġvĀtj i we`vj tqi weÁvb wġġKMY beg-`kg tkYxi c`v_ ©weÁvb eBwU
tkYxKtġ covtZ Amyeavteva KitQb|]

MtelKtK Gictii c`ġġc nj wZwb GKwU KvhRi w^xvšMġY Kitġb|

[D`vniY: MġvĀtj i weÁvb wġġKt` i c`v_ ©weÁvb m^zK wWwMŌbv _vKvi KvitY Zviv
evBwU covtZ cvi tQb bv|]

GB w^xvšwU MtelKtK Dch^y cixġġYi gva`tg cġvY KitZ nte| m^zivs ZvtK
cġqRbxq I Dch^y tools ev nwiZqvi mbr³ KitZ nte|

Dctii mgm`wU AbvgZ w^xvš m^utġ tKvb w`i e`vL`v tctZ ntj MtelK wntmte
Avgiv miwmi mġġvKvi, cġgjjv, BZ`w` wefbaatbi nwiZqvi e`envi KitZ cwi |
cieZġZ Z_`w`k; ntZ representative sample ev cġZwbaZkxj bġbvi gva`tg Z_`
msMġ Kie| hw` cġgjjv e`envi Kwi Zte cġgjjvi gva`tg th Z_` cvlqv hvte
tm_ tjtK ce`wba^w Z wKQywbqg Abgytbi tkYx^xKiY KitZ nte| Gici Z_`
wġk- IY Kti th msuġB ifc cvlqv hvte Zvi mivntġ` AbvgZ w^xvšwU Avgt` i hvPvB
Kti t`L tZ nte|

Dctiv³ mgm`wU tġġġ t`L tZ nte djvdj hv tcjvg Zv wK mg_ġ Kti th MġvY
weÁvb wġġKt` i c`v_ ©weÁvb eBwU covtZ m^wZ`Kvi At_ ©Amyeav nt`Q?

hw` `Qfite tKvb w^xvš tġġ^v m^e bv nq Zvntj Avgt` i w^xvš cwi gvRġ
KitZ nte ev crġtZ nte Ges cwi gwR^z hypothesis Gi Avtj vtK bZb Kti Avevi
Z_` msMġ I wġk^dY KitZ nte|

Aek` c`qvRbterta Mtel K tKvb c`t`c`xNqZ Ki tZ cvtib ev tKvb GKUJ avc tK
Gwotq P t j b | Dbz we t k ; Mtel K KL t b v KL t b v w b R ^ M w Z t Z w b R ^ c x w Z t Z I Mtel Yv
K t i _ v t K b |

GB cvtVi gva`tg wk`qv Mtel Yv c x w Z i m`te` avc , t j v i m v t _ c w i w P Z n j v g |



cvtVvEi gj`vqb- 1

- **msw`jB DEi c k a e**

1. wk`qv Mtel Yv cwi Pij bv Kivi we w f b r a v c w k ?
2. wk`qv t`q t i Avcbri w b R ^ t c k v w f i E K M U x i g a ` n t Z G K U J m g m ` v w P w y Z K i a b
t h u J m a t U M t e l Y v c w i P w j Z n l q v D w P Z e t j A v c b r i a r i Y v |

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_©weAvb l imvqb weAvb civ`
`ŷuI weiqe`i MŷYthvM`Zv gvcZ Prt`Qb|

Gt`i j ŷŷ`j hŷ ŷcZvqvZv ev AwffveK nq Zte Mtel Yv KvR cvi Pj bv Kivi mgq Gt`i cjt`bv civ`cyK Ges bZb civ`cyK Dfqb DcKiY wntmte e`envi Kitz nte| G, tj v`K Avgiv gj- DcKiY bv etj “visual aids” ej e|

Kvthc`thvMx Mtl Yv c×wZtZ Mtel`Ki cKwZi Dci wbfP Kti DcKityi cKvif` | GB aiti bi cheŷŷYthvM` DcvE wZb aiti bi nq –

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

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

welqx Abyvb c×wZtZ cheŷŷYi gva`tg, cKŷvjv, mvŷŷvrv Kivi Ges msiwŷZ Z_`
tikw`e`envi Kti KvR Kiv nq etj G, tj v`K DcKiY wntmte AvL`wqZ Kiv nq|

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

Avgiv t`Ltz tcjvg wkŷŷv MtelYvq th c×wZB AbyviY Kiv tnvK bv tkb cŷ`ŷŷ
cheŷŷY, wj wLZ cKŷvjv, tgŷwLk cŷkwe`i ce,© AwWI -wfiwI aviY Kiv hŷcwmZ,
msiwŷZ ev cKwKZ Z_` DcKiY wntmte e`euZ nq|



civVvEi gj`vqb - 2

- msiwŷB 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 cKviti i nq?
 4. weewZgj-K DcvE msMŷ Kitz ntj MtelK wK cŷLqv AbyviY Kiteb?
 5. wkŷŷv MtelYv tŷŷŷ DcKityi cŷqvRbxqZv mstŷŷc e`³ Kiab|

cW 3

Z_ msMh tKŠkj I DcKiY : cŃqM I mgve×Zv

Dfík

GB cW tktI AvciB —

- ◆ *ukŃv MtelYv KvŃRi Rb cŃqvRbxq Z_ msMhni tKŠkj mbv³ KiŃZ cviŃeb Ges*
- ◆ *weŃkl tŃŃŃ DchŃ tKŠkj cŃqM c×wZ eYbV KiŃZ cviŃeb|*

Avgiv ceŃZP`Bw cŃv Rvbjvg MtelYvi cKviŃf` Ges eŃŃZ cŃijvg MtelK`Ńji w`iKZ.Dfík` AbŃvqx wfbœwfbœDcKiY e`envi Kiv nq| GB cŃv Avgiv Z_ msMh Kivi KŃqKw tKŠkj m=ŃU AvŃj vPbv Kie|

Avgiv`i me mgq gŃb ivLŃZ nŃe 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_Ń ukŃv MtelYvq GKw cŃk mgm`v ev cŃ:Â _vKŃe, DcivE msMh Kiv nŃe; DcivE weŃk- IYceŃ e`vL`v cŃZ Kiv nŃe| DcivE Aek`B wbfŃŃhVM` Ges h_v_ŃŃZ nŃe|

Dcv³ ukfite msMh Kiv m=Ń?

tU=útj U, tPKij ÷, AaŃ`hi Z mŃŃvRkvi, repertory grid cŃkŃvj e`envi KŃi –

MtelK`j Zv`i cwiKŃbv chŃq w`i KŃi tbb tKvb aiŃbi KgŃ`i mnvqZvq uk aiŃbi DcKiY e`envi KŃi tKvb cŃuqvq Z_ msMh KiŃeb|

cŃZKZ cŃkŃvj

cŃkŃvj vi gva`tg Z_ msMh Kivi cŃqvRb hw` gvVKgŃwŃtqM Kiv nq ZŃe MtelYvi Dfík` AbŃvqx thb DŃi AvŃm tmw tK j ŃŃ` tiŃL gvV KgŃ`i DchŃ cŃkŃŃY w`ŃZ nŃe| DŃi`vZvi DŃŃii`ŃQZv, mZ`Zv thb weŃwZ bv nq ukŃev DŃi`vZv thb LvgtLqjx DŃi cŃvb bv KŃib Gw tK gvV KgŃ`i AZ`ŃŃmRvM _vKŃZ nŃe| gvVKgŃ` th me weŃtq tLqj ivLŃeb tm,Ńjv nŃQ– DŃi`vZvŃK GgbfŃe cŃkŃKiŃeb bv thb Zu`ŃZk³ DŃi w`ŃZ AcviM KŃi| gvVKgŃ` DŃi`vZvŃK mnv` Kivi Rb` bvbvi Kg visual aids e`envi KiŃZ cŃŃib|

cŃkŃvj cŃZKivi mgq tLqj ivLŃZ nŃe thb MtelYvi cŃqvRŃb th aiŃbi Z_`tLwRv nŃQ` , iazŃŃcŃkŃe gva`tg Zv AZ`ŃŃmVKfŃe thb cŃlqv m=Ń nq| [mŃzi vs cŃtgb MtelK`j uk aiŃbi Z_`Pvb Zv mŃŃŃŃfŃe tŃvU tŃvU evŃK`i gva`tg wj ŃL thŃeb|

tKŠkj MZ e`vL`v

cŃwK Ae`vq m` cŃkŃŃY cŃB gvV KgŃMY mŃVKfŃe cŃkŃvj e`envi KiŃQb ukbv tm m=ŃU wŃwZ nŃl qvi Rb` KŃqKw DŃi MhY chŃq AwŃI tiKwŃŃ Gi e`e`v Kiv

DipZ| gj- MtelK `tj i tKvb AwfA m`m` GB ti Kmw`e`envi Kti gvV Kgfl KvtrI
`gp w`K, tjv mbv³ KitZ mrvh` Kiteb|

chfeqtYi gva`tg Z_` msMh

wZxq tKSkj

chfeqtYi gva`tg Z_` msMh KitZ ntj MtelK `j tK cU`tgB DfIk` wbfP GKwU
tPK wj ÷ cOZ KitZ nte| GB tPK wj ÷ e`envi Kvtr thb chfeqY `v`Q``teva
Ktib tm Rtb` ZvTK cY`avi Yv w`tZ nte| tPK wj t÷i mwK e`envi Rvbr `vKtZ nte
chfeqtYi| wbitcqtYite thb chfeqY KvruU m`ubaeKiv m`e nq Zvi w`tK j q`
ivLtZ nte|

cteqiKWRZ.Zt_`i gva`tg Z_` msMh

ZZxq tKSkj

tKvb wKqv cOZovbi wKqv_`i GKvWwgK DrKI`Zv, tLj vajv w`lqK `qZv, wWteU,
Dciv`Z e³Zv w`lq cvi `wKZv- Gme w`lq KvR KitZ ntj wKqv MtelKMY gva`wgK
Z_` e`envi KitZ cvtib| Gtqt`i tiKWRZ.Zt_`i mZ`Zv hvPvB Kivi tKSkj RvbtZ
nte| wba`wi Z mgqmgvi gta` thb KvruU m`ubaeKiv m`e nq tm Rtb` `f Zg mgq
Z_` AvniY tKSkj AvqtE `vKtZ nte Mtel`Ki |

gj- MtelK `tj i m`m`e,` hw` wbtRiv gvV chfeqi Z_` msMh bv Ktib Zte gvV
Kgfl`i Rb` GKwU wbt` Rgvjv `Zvi KitZ nte hvZ Zviv wbtRt`i KvruU Kivi myúo
BwZ cvb| tKvb cKae`axti axti Kiteb, Klb w`eivg MhY Kiteb, Klb cKwU
wZxqevi D`PriY Kiteb, Klb DEi `vZvTK wPšv KitZ ej`teb BZ`w` BwZ `vKte
GB wbt` Rgvj vq|

GB cvtV Avgiv t`LtZ tcjvg MtelYvi cOqvRbxqZv mbv³ Kiv, DfIk` wba`Y Kiv
thgb `iaZcY`wK tZgub `iaZcY`Z_` msMh tKSkj wba`Y Kiv Ges Z_`
msMhKvixTK cKqtYi gva`tg mwKfite cOZ Kiv|



cvtVvEi gj`vqb- 3

- **mswqB DEi cKae**
 1. gvV chfeqi cKqvjv Rvvc Kvtr mgZvite KvR nt`Q wKbv Zv chfeqY Kivi Rb` gj- MtelK wK aitbi e`e`v tbtet?
 2. chfeqtYi gva`tg wKfite Z_` msMh Kiv nq?
 3. cteqiKWRZ.Z_` wKfite GKRB MtelK e`envi Kiteb?

cW 4

mvḡvrKvi tKŠkj

Dḡiḡ

GB cW tḡi Avcb—

- ◆ mvḡvrKvi tKŠkj i ḡkó" mbv³ KtZ cviḡeb;
- ◆ mvḡvrKvi tKŠkj i cKviḡf` wj LtZ cviḡeb Ges
- ◆ Mḡel Yv mvḡvrKvi i %kó" eYḡv KtZ cviḡeb|

mvḡvrKvi

Mḡel Yvi Z` msMḡ tKŠkj wḡmḡe e`eüZ mvḡvrKvi gj-Z wZbW ḡkó" gwÉZ nḡ
_vḡK|

- Mḡel Yvi Dḡiḡi cḡḡ cḡZdj b wḡmḡe mvḡvrKviḡK cḡvb Z`
msMḡni Dciḡ wḡmḡe MY" Kiv mḡe|
- mvḡvrKvi i gvaḡḡ cḡĀ (hypothesis) hvPvB Kiv I cḡqvRbḡeḡa bZb
cḡĀ Dc`vcb Kiv mḡe|
- Ab`vb" tKŠkj i mḡ_ hḡfḡe e`envi Kḡi mvḡvrKvi tKŠkj Mḡel Yvi
undertaking wḡmḡe e`envi Kiv mḡe|

mvḡvrKvi tKŠkj mḡḡK tḡvḡḡḡ Pvi fvM fvM Kiv nḡ|

- web`vmKZ.(structured) mvḡvrKvi
- Aweb`vmKZ.(unstructured) mvḡvrKvi
- Acwi Pwḡ Z (non-directive) mvḡvrKvi
- tK`ḡḡZ ev wḡḡḡ (focused) mvḡvrKvi

cḡḡB Avḡiv ḡḡMḡel Yv mvḡvrKvi ḡḡ avi Yvwi mḡ_ cwi wPZ nB| Bḡi wR msÁvW
wḡḡḡc—

“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 vḡ i fcvšḡi Z Ktḡ msÁvW wḡḡḡc nḡZ cviḡi—

mvḡvrKvi MḡYKvi x KZR.Dl wcz `ḡ e`w³ i Kḡ_vcK_b tK Mḡel Yv mvḡvrKvi ej v
nḡ hLb GB Kḡ_vcK_ḡbi gvaḡḡ Mḡel Yv msḡvšl cḡqvRbxq Z` msMḡ Kiv nḡ|
GLvḡb mvḡvrKvi i ce`wbaḡi Z welqe` Mḡel Yvi Dḡiḡi Dci wbfḡkxj Ges
mvḡvrKvi i GKw mḡyúo ḡḡl GB Dḡiḡi KZR.wPwḡZ _vḡK|
UvKḡvb Mḡel Yv mvḡvrKvi i KḡKw ḡkó" mbv³ Kḡiḡb thgb,

- GB ai#bi Kv#Ri Rb` mv#vrKvi MhYKvixi c0qvRb nq|
- Dch# e`w3 ev e`w3eM#K A_#mrvh` c0vb Ki#Z nq|
- ckaKivi ht_0 m#av_v#K GB tKSk#j |
- Z_` ms#KvP#bi c0# m#ebv i#qtQ|
- mv#vrKvi `vbKvixi msL`v ckgvjvi mrvh#` msM#xZ M#el Yvq AskMhYKvixi tP#q A#bKvst#k Kg nq|
- msM#xZ D#i i msL`v ckgvjv M#el Yvi tP#q te#k nq|
- Z_` we#fb#Kvi#Y weKZ.ntZ cv#i, Gi g#a` i#qtQ mv#vrKvi MhYKvixi `#Zv, DcKi#Yi m#gve#Zv, Z_` c0#qve#Ki#Yi m#gve#Zv BZ`w` |

Avgiv Gevi Dc#i#vj - wLZ Pvi c#Kvi tKSk#j i , Yv, Y wePvi Kie|

- Structured Gi t#t#` we#q#` Ges c0#qv ce#ba#i Z nq| A_# c0#k# #g Ges MVb wK c#wZi n#e Zv mv#vrKvi MhYKvix#K Rvb#q t`lqv nq d#j c0#k# aviv cv#eZ#bi t#vb `#axbZv Zvi _#K bv|
- Unstructured mv#vrKvi Ab`c#` D#y# ai#bi A_# GL#b mv#vrKvi MhYKvixi `#axbZv eRvq _#K| M#el Yvi c0#qvRb#qZv Ab#vq# c0#k# aiY #ba#i Z n#j l G_#jvi we#q#` ; #g Ges kv#K MVb mv#vrKvi MhYKvixi Dci w#f# K#i |
- Non-directive mv#vrKvi gj-Z t#lvc# ev g#b#`Av#bK mv#vrKvi ai#bi| GL#b mv#vrKvi c0#vbKvix Zvi B`Qv Ges #gZv Ab#vq# Zvi gZev` ev Ab#v#Z c#Kv# K#i, A_# GL#b mv#vrKvi MhYKvix gj-Z t#vb c#Kvi w#t` Rbv t` b bv ej #j B P#j |
- Focussed ev w#t` #KZ mv#vrKv#i t#t#` mv#vrKvi MhYKvix mv#vrKvi `vbKvixi Ggb GKwU cv#i#PZ Ae`v w#t#q KvR K#ib t#wU MhYKvix c #eB we#k- lY K#i#Qb| eZ#vb mv#vrKv#i gva`g ce#ba#i Z c0#` M#xZ ev e#R#Z n#lqv c#` ev we#c#` Z_` msM# K#ib mv#vrKvi MhYKvix| A_# GL#b `vbKvix c0#E m#w#` D#i i gva`g GKwU e`w0 w#t#cvU`c#Z Kiv nq|

M#el Yv mv#vrKvi c0#qvq h#` mv#vrKvi `vbKvix m#wK D#i `vb c0#Z _#Kb Ges MhYKvix cv#i `w#i K m#uK`vc#bi gva`g h#` c0#ZwU ckaMhY#h#M`Zvi m#t_ D#vcb Ki#Z cv#ib Z#e GB tKSk#j i gva`g t#vUv#y# w#t` # Z_` Avni Y Kiv m#e|

Avgiv Gevi t`Le D#i `vZv wKfv#e m#e` D#i#K w#f#`h#M` ev Aw#f#`h#M` K#i tZ#j b|

cW 5

ckgvyv: cÖZ cÜvj x l e`envi

Dfik`

GB cW tkfI Avcwb—

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

wkqv MtelYvq D`Pzi e`AmbK MtelYvi gZ tkvb `vgx, Ruj MtelYwvi, m` 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 euj e`eüZ tKskj |

ckgvyv wZb cKviti— WwKthvM tclZ ckgvyv, `tji Dci cÖqMKZ.ckgvyv, e`wMZ mvqvzi mgq e`eüZ ckgvyv| mvqI Avb m`ubæGes cÖkæ , iaz; Abæveb Kti wR`^AvMh cÖZw cÖkæ mwK DEi wPwYZ Kiteb ev wj Lteb j q` `tji `enkó` m`fÜ GiKg m`æbv vKtj B WwKthvM ckgvyv tclZyi gva`tg DcvE msmh Kiv m`æ nq| Avgiv GiKg GKw e`envi t`L tZ cvB 1972 mvj MWZ ÖÖRvZxq wkqv Kwgbw Gi Kg`cÜvj tZ| GB Kwgbti wicvU`wbtar`3 DjtL itqtQ:

ÖÖAvgv`i wkqv e`e`v I Zvi wewfbæmgm`v m`útk`RbgZ hvPvBtqi Rb` GKw ckgvyv t`tki wewfbæ`titi wkqv cÖZövb, bvbmea ms`v, wkqvZx, wkqvne` Ges tbZæ`i wKU tclZ nq| ckgvyv wU msev`cI gvidZI cPwvZ nq| G e`vcviti tek Drvine`ÄK mvov cvlqv tMtQ| cÖB Reve,wj KwúDUvi Övív wtk- 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 wbaftiYi tKskj wPwYZ Ki tZ nte|
- cÖqvRbxq Z_`tK mnRteva` cÖkæ gva`tg Ztj ai tZ nte|

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

QṭKi AvKṭi ev ḡ DĒigj-K cḡk [Fixed response (closed) questions]

G aiṭbi cḡk DĒi ḡZvi gZvgZ cḡkṭki mḡhM ḡṭKbv ḡKŠ MṭeIK Aí cwi kṭg DĒi ḡṭk- I ṭYi gvaṭg ḡmḡṭšṭcḡṭZ cṭib|

tLvjv DĒi [Open ended (free) questions]

GLṭb DĒi ḡZv Aí Kḡvq ṭKvb ḡḡ ḡ ḡelṭg Zvi ḡR ḡḡZvgZ eḡḡ KṭZ cṭib|

cḡgṭv ḡZvi I cḡṭMi cḡṭc

- mḡmḡ ḡḡ ḡ Kṭi ḡḡi KṭZ ḡṭe ṭKvb cḡkṭii Zṭḡi gvaṭg DĒi cṭi qv mḡe|
- (Dcṭivj- ḡLZ) ḡḡ cḡkṭii ḡṭaḡ ṭKvbḡṭZ KZḡḡ cḡkḡKiv ḡṭe?
- cḡḡ Lmov cḡZKiy|
- bgḡv DĒi ḡZvi gvaṭg Lmov cḡgṭvi ḡVb hvPvB|
- cḡB mḡṭjvPbvi ḡḡḡṭZ cḡḡ Lmov DbḡZKiy I Pḡšṭ cḡgṭv cḡZ Kiv|
- ḡḡ ḡ j ḡḡḡ ḡj i Dci cḡgṭv ḡḡ cḡṭM|

ciYKZ cḡgṭv ṭdir cṭi qvi ci hv Kiv nḡ Zv ḡḡḡ –

- cḡB ciYKZ.cḡgṭvi DĒi ṭkḡḡḡ Kṭi ḡṭkḡY Kiv|
- DĒṭi ḡḡḡṭZ Pḡšṭḡṭcṭiḡḡḡ ḡḡ cḡZṭe ḡḡ ḡZvi Kiv|

cḡgṭv ḡZvi Kivi mḡḡ ḡḡḡ ḡelq, ṭjvi cḡZ ḡḡ ḡḡZ ḡṭe Aḡ cḡgṭvi ḡḡḡḡ ḡṭe ḡḡḡḡ–

- cḡgṭv ḡḡ ṭhb AvZvi ḡḡ eo bv nḡ|
- evKḡ ṭhb mnRṭevaḡ Ges ṭQvU nḡ|
- cḡkḡ ḡḡeḡḡḡ ṭhb ḡ, iḡZḡḡḡGes ḡḡḡḡḡ eḡḡ nḡ|
- cḡkḡ DĒi ṭḡḡḡ ḡḡḡZv BḡQv, Drmḡn ṭhb j ḡḡḡ ḡj i ḡṭK|
- ḡḡḡ ḡKZ cḡkḡ(leading question) ṭhb ḡṭZ bv ḡṭK|
- ḡḡḡḡḡḡḡ ḡelq eḡḡ ḡṭaḡ ṭhb aviv eRiv ḡṭK|

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 cvlqvi 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 eÜZŷŷŷGes webqx nq tmw`ŷK `wŷ ivLŷZ nte|

e`wŷMZ mvŷŷv ev gvVKgŷŷ gva`tg th ckgij v e`envi Kiv nq tmLvŷb gvVKgŷŷ`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`|

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



cvŷVvEi gj`vqb - 5

• **msuŷŷB DEi cŷŷe**

- 1. wKŷŷv 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|

civ 1

MtelYv tčŭcivRij : , iazpYq K

Df`ik`

GB civ tkfI Aircib —

- ◆ tčŭcivRij cŭZ Kivi wefbaŷ K, tjv mbr³ KiŷZ civteb|

tckvq ubtqmRZ t_ŷK tckvMZ tKvb mgm`ivi mgvaib LŷR tei Kiv ev bZb tKvb ZŷEj Avve`vi ev tKvb Dbqab 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 tkl chŷi AZ`ŷi cwi Kw Zfvte GŷMŷZ nq| MtelKe,` KvR Kivi Rb` ZvB cŭtgB GKw KihRi 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 cŭwgKfvte 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 Abjveb Kiv|
- mæte` mgvaŷbi w K ubŷ` Rbv tLwRv|
- mæte` mgvaib mbr³ Kiv|
- cŷ`wKZ djvdj Ges mŷav eYŷv Kiv|
- mgvaib ARŷbi jŷŷi` MpxZe` c`ŷŷc ubYŷ Kiv|
- MtelYv KvR cwi Pvj bv Kivi Rb` cŭqvRbxq mæuŷ`i cwi gvY ubaŷY Kiv|
- mgvaŷbi mætebv ce`gj`vqb Kiv|
- cŷ`wKZ DcKvi ev mŷhvM cŷt gj`vqb Kiv|
- djvdŷj i cwi gvYmgŷ mbr³ 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 wceX KiŷZ civtib|

QK 4-1.1

mgm`wU Abjveb Kiv	Avŷj vPbvi gva`tg mgvaib tLwRv	mgvaib mbr ³ Kiv	cŷ`wKZ djvdj I mŷav eYŷv Kiv	mgvaib ARŷbi jŷŷi` MpxZe` c`ŷŷc mŷgŷ

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 GKwU 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

Kvh9máuv`tbi c`tq/c máutKAvtj vPbv

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

lô c`tq/c

máut`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 wfiÉtZ 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 wfiÉtZ 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 hvte`Q G máutU wbwDZ nlqvi Rb` c0qvRbxq KqvU PjK ev indicator e`envi KitZ nte Zv mn G mgq Z_` mSMh cxwZ Povšfite w`i Kiv nq|

GB cvfV Avgiv MtelYv tc0civRvj wKlb cxwZ máutU c0_wgK aviYv jvf Kijvg| cieZP cvW_ tjtZ 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 mgyevxZv wbtq Avtj vPbv Kie|



cvfVÉi gj`vqb - 1

- mswfjB DEi c0æ
- 1. MtelYv tc0civRvj c0Z Kivi _iaZjKZLwb?
- 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_ tjtj Zvij tq t`LtZ nq?

A_ĊÜß

Dġġk

GB ciW tkġl Avcġb —

- ◆ MġelYv KvġRi Rb" A_ĊÜßi cKviġf" ġPwġZ KiġZ cviġeb;
- ◆ MġelYv KvR mġúv`ġbi weġfbæchġq th A_Ċe"q nġe Zvi mġte" cwiġvY šbaġġY KiġZ cviġeb Ges
- ◆ A_ĊÜßi mġtebv ġPwġZ KiġZ cviġeb|
- ◆ MŲU I K>Uġ± Gi ġta" cv_Ĥ" mbr³ KiġZ cviġeb|

mvavi YZ MġelYv KvġRi Rb" th A_Ċe"q nq Zv `BġU ġġ- Drm ġ_ġK cvl qvi mġtebv _vġKt mi Kvix Ges ġemi Kvix| mi Kvi U`v- Ges Ab`vb" weġfbæivR`ġgva`ġg msMġvZ Aġ_P GKġU šbv`ġ Ask weġfbæcġqvRbxq I Rb_ iæZcYġġ ġKi MġelYv KvġR Abġyb, ġġvb šntġte cŲvġbi Rb" šbv`ġ Kġi ivġLb| mgvġRi abx, weĤkvj x e"ġ³, Rb`i`x, mgvRġmex e"ġ³MY ġKvb šbv`ġ ġġKi MġelYv KvġR cġqk A_ĊAbġyb šntġte cŲvb Kġi _vġKb|

MŲU Ges Pġ³ ġfiĤK KvġRi aviv mġġU cwiġPZ nlqv ġvK Gevi| GB `BġU kġ Avġiv AġbK mgq mgv_Ĥ šntġte e`envi KiġġI ġġi ġta" , iæZcYġġġ- cv_Ĥ" iġqġQ| ġKvb e"ġ³ MġelK ev MġelK `ġġK hLb Zvġ`i šbR`MġelYv KvR Kivi Rb" A_Ċmġvġh" ġ`qv nq ZLb ZvġK etġ MŲU| Acicġġġ ġKvb divġ, ġġRġYx hLb šbv`ġ Pġ³ cġġi ġva`ġg ġKvb `ġ, ġMvŲ ev e"ġ³ weġġtli ġKvb šbv`ġ MġelYv Kivi mġġav ŲŲġqŲŲ (buy) Kġi tbb ZLb ZvġK K>Uġ± etġ |

MŲU Ges K>Uġ± Gi ġta" tek ġKQġġ ġġYxq cv_Ĥ" iġqġQ|

K>Uġ± c×ġZi ġva`ġg mi Kvix ms`ġmġR RbMYġK ġnev cŲvġbi Rb" mi Kvix cġZŲvb ev th ġKvb Aj vġRbK ġKsev j vġRbK (profit) ms`vi mġġ_ thġMġthvM `vcb Kġi| G ġġġġ K>Uġ± Gi ġva`ġg A_Ċmġvġh"ĊÜß MġelK ev MġelYv ms`v MġelYv KvRġU cwiġPġbv Kġib| MġelYvi weġqe`; c×ġZ mspvġġġ ġġ- šġ`Rbv ev KgĊc×ġZ šġqvMKvix ms`v ġVK Kġi _vġKb| ġaiġbi KvR AvBbMZ šbġġbġZi Avl Zvq Kiv nq|

MŲU cŲßi ġġġġ MġelK `ġ ev ms`v šġġġi cġġm Ges MvBW Gi bġvZġġv Avġvġi KvR Kivi Rb" iġvġġ A_ĊÜßi Rb" Avġe`b Kġib| ġġġġġ A_Ċmġvġh"Kvix ms`v ġKvb šġ`Rveġġ ġ`b bv|

c0R±i eY0v

Dfík

GB civ tkfI Avcwb—

- ◆ c0R± eY0v ij Lb c×wZ m±tÜ e`vL`v c0vb Ki±Z cvi teb Ges
- ◆ c0R± Duj wLZ Dfík`i cKvif` Ki±Z cvi teb|

c0R± KvRi GKwU cY0 Ges `Q eY0v Qvov MtelYv KvR mdj Zv jvf Kiv Am±e| GKwU c0R± eY0vq wZbwU , iazCYAsk _vK| G, tjv n±Q-

- j 9` I Dfík,
- Kg0×wZ (Project activities) I
- gj`vq±bi cvi Kí bv|

Avgiv Rvb, j±9`i gva`tg MtelYv Kg0i AZ`sf`ieZ0mgqmgvi c0Z `w0 ubeÜ Kiv nq| Ges Af mgq mgvi gta` j 9` AR0 Kiv m±e bq| j 9` wbr 0 Kivi mgq Zv±Z MtelYv KvRwU th AA`tj c0qvm Kiv nte Zvi Dfík _vK| A_0mrvh` c0Bi m±0ebv _vKtj Avte`b c±Ii m±_ j 9` Dfík Ki±Z nq| j 9` thb t`tki AvBbMZ m±0avi cvi cšx bv nq tm w`tk tLqvj ivL±Z nte|

Dfík`i m±_ m±úwKZ actions ev KvRi gva`tg j 9` AvRZ nq| m±Zivs Dfík` `ú0, AR0thvM` Ges cvi gvc±hvM` nte| Dfík`i gva`tg tevSv m±e th MtelYv KvRwU Ki±Z wK cvi gvY mgq j vMte| m±avi YZ c0ZwU c0R± ASZc±9` wZb/PvrvU AvPivYK Dfík` wPvY±Z Kiv m±e|

Dfík` 0 cKvii nq – c0uqvMZ Ges djvdj MZ|

c0uqvMZ Dfík` ev Process Objectives

Kvg` j 9`-tj tc0v±vvi Rb` wK ai±Yi c`±9`c M0Y Ki±Z nte ev wK c0uqvq KvR Ki±Z nte Zvi eY0v _vK c0uqvMZ Dfík`; wKš` j 9`M`tji Dci Gi m±0e` djvd±j i tKvb Dfík _vK bv G±Z| GB ai±Yi Dfík` wPvY±Z Kivi gva`tg th mg`l cix9`Y m±ú0eKiv nte ev th ai±Yi D`m±0ebxgj-K tKškj c0qvm Kiv nte tm m±tÜ aviYv AR0 Kiv m±e nq|

djvdj MZ Dfík` ev Outcome Objectives

GB ai±bi Dfík` GKwU m±0v 0 j 9`-j±K wPvY±Z K±i Ges Gi Dci KvR Kiv n±j wK ai±Yi djvdj cvlqv hvte ZvI Rvrv m±e nq| djvdj MZ Dfík`i gva`tg AvPiY, `9`Zv, `w0f0z, gj`teva, veklm, Avb Ges kZmg±ni cvi eZ0 m±tÜ Rvrv

mæ nq| mŷw`θfvte e`³ djvdj MZ Df`k`i gta` wbtgæ³ `enkó` we`gvb
_vkte –

- mgqmŷv
- j ʃ`j
- th msL`K RbMfYi KvQ tcŷvfv nte Zvi DfjL
- cZ`vKZ Ges cwi gvc`thM` djvdj ev DcKvi
- tFšMŷj K `vb ev cixʃfYi j ʃ`j |

Df`k`i gva`tg j ʃ`j i eqm, wj ½, AvÅw 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 wPšf fvebv Kti w`i KiZ
nte Zuv Avmtj wK Pvb –

ŷŷKvb wefkl welfq j ʃ`j i Avb eŷx Kiv hvfZ Kti Zvf`i AvPiY cwi ewZŷ nq?ŷŷ
tmfʃf`f e`vcv wK GiKg th, j ʃ`j cŷqvRbxqZv Avb AvQ wKB wKš` Zviv
KwŷʃZ I `v`mæZ AvPiY KiQb bv; A_ŷ MtelYv djvdj cŷqvMf gva`tg axfi
axfi GB j ʃ`j`K AvPiYi cwi eZθ NUvfZ mæZ Kivfv mæ nte|

D`niY

Avgiv GKw cKwKZ weÅwSi gva`tg ev`é D`niY t`LZ cwi– 1999 mtj tg
gvfmi `wbtK cKwKZ GKw weÅwSi Ask wefkl Zfj aiv nj | weÅwSi cŷvi
KtiwQj ŷŷwdfj tmfKŷvix `ŷ G`mm÷`vY cŷR±ŷŷ wKŷv gšŷYvj q|

ŷeisj v`k bvix wKŷvi nvi eŷx Ges Dbqb KgRvŷŷ bvix mgvRi e`vcK AskMŷY
wbuŷZ Kivi j`ʃ`f t`tki 118w _vbrq cKfif,³ wKŷv cŷZŷvfb gva`wK `fii
Qvŷf`i Rb` DceŷÉ I wUDkb wd cŷvfb gva`tg QvŷmsL`v eŷx cKfii Ab`Zg
Df`k`i|ŷŷ

GKw ev`vKvfi j ʃ`j ev`évfbi Rb` ARŷthM` GKw Df`k`i wPwYZ Kiv nqtQ
GLvfb| Df`k`i gta` tFšMŷj K `vbi eYŷv itqtQ, j ʃ`j DfjL itqtQ,
BZ`w` |

mveavZv

cŷR± tcŷcvRvʃj Df`k`i wj Levi mgq th w`K `wŷ w`fZ nte Zv n`Q –

- GKw Df`k`i gva`tg GKw gvŷ cwi gvc`thM` Outcome MY` KiZ nte|
- AvZwi³ eYŷv thb Df`k`i gta` mibteŷK bv nq|
- Df`k`i thb mnRfava` Ges `úo nq|
- Df`k`i eYŷv thb ev`évbM nq Ges AvkwZwi³ cŷZÁv thb GfZ bv _vK|

ḡ Ae GWKkb

weḡkI Kḡi A_ḡvnh" MḡY Kḡi MḡeIYv KvR Kiḡj j ḡ" iḡLḡZ nḡe thb AḡZwi³
Dḡiḡk"i eYḡv cḡB dj vdj ḡK ḡḡhḡ_ó bḡḡḡ eḡj ḡPḡY³ bḡv Kḡi | KvIY GiKg mḡḡebḡ
ḡ`Lv ḡḡj mḡvnh"Kḡix mḡ`v A_ḡḡvḡb AmḡḡZ cḡvb KiḡZ cḡḡi |



cḡḡVḡḡi ḡj`vḡb - 3

- **mḡḡḡB Dḡḡi cḡḡe**

1. MḡeIYv cḡRḡ ḡcḡḡcḡRḡḡj ḡḡvU KḡḡU , iḡZcYḡAsk_ḡḡK?
2. MḡeIYv cḡRḡ KvRi ḡḡa" Dḡḡ ḡLZ Dḡiḡk" Kḡ cḡKḡḡi i nḡZ cḡḡi?
3. cḡRḡ ḡcḡḡcḡRḡḡj Dḡiḡk" ḡḡ 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 QKmg#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 GKU I q0KumU (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 QK

c0R±i Df`ik`mgn	cvi Kwi Z KvR ----- ----- -----		c0R± Kv`Ri gj`vqb
	KvhRj vc (c0Zgj-K)	ev`evqbKiv xb KvhRj vc	
c0Z`mkZ dj v dj ev DcKi Y`K`K`			K ai`Yi gj`vqtb i gva`tg wBY0 Kiv nte th KvR c0Z`mkZ dj etq Gtb0?

cvi cKwi Z KvR

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

- 18-34 ermi eqmx gunj vt`i gta` 200wU 00`r` i 0v00 wDR tj Uvi gyY Kti weZiY Ki`Z nte|
- 118wU _vbvq cKif,3 w0v c0Z0v`tb gva`wgK `f`i i QvT`i i DcevE c0vb Kiv nte|

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

c0vZgj-K KvhRj vc

MteIYv c0R± KVR iiaKivi Rb" m=úY©Kv†Ri GKwU Zvj 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 KvhZvj Kva|

thgb G†Z _vK†Z cv†i –

- wbtqvM cwi Kí bv
- vb/mvæavw`i eY0v
- w†kl DcKiY/hšçwZi Zvj Kv
- c0ZthvM" e`i Zvj 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 k†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`mkZ 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†e wbu0Z n l qv hv†e0 GB c0k†e D†i _v†K|

cY0% c0R± KvhRjvc wj Lb

KvhRjvc k†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` ciq| tKvb ai`Yi KivR Kiv nte Ges wKfite G,`tjv Kiv nte ZviB eYb`v _v`K GB Q`K|

maviYZ GtZ vbtax³ Askmgv`_v`K -

fvgKv, `vb/mv`eavi vbe`pb, Kgp`vbtqvM cwi Kíbv, DcKiY ev nviZqvi vbg`pY, me`kl DcKi`Yi eYb`v, mn`thvMZvgj-K KvtRi eYb`v, KgybuU ev Av`Aj K m`u`³ 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`cú`k` Kiv nq GB Q`K|

KvtRi m`te`Zvgj-K OK

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

mgqmvvgj-K ev Time Line OK

A_`mivh`Kvix ms`v MtelYv KivRvUi mgqmvv m`tU Jrmj` cKvk Kitz cvti GB w`tkj`q` ti`L GB Q`K c`ZvU `fii vbw`` mgvqi Dtj`L _v`K|

g`tb 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`lAskmg`ni msv`q`B eYb`v| tcjvg GB cvtV|



cvtVvEi gj`vqb - 4

• msv`q`B DEi c`kæ

1. c`R±i IqvK`m`tu wK ai`bi eYb`v _v`Ktj GKRb MtelK vbw`šg`tb KivR Kitz cvtib?
2. cY`% c`R± KvhRj v`c tKvb v`elq miv`v`w`KZ _v`Kte?

ḡ Ae GWḡKkb

Dḡik

GB cıW ḡkḡl Avıwb—

- ◆ D`niY Dc`ıbcceḡ MḡelYı cḡRḡı cḡKıZ e`ıL`ı KıtZ cıḡḡb|

GB cıḡV Avḡıv evsj v GKıḡWḡx I ḡıḡqıḡUK ḡıḡıḡBıḡ Ae evsj vḡ`k KZḡ cııPıḡ Z
 `Bıḡ MḡelYı cḡRḡıı ıfḡḡıLı ḡ`Le| ııḡıḡı ḡ`kıḡ D`niY Dc`ıḡḡbı Dḡıḡk` GB
 D`niY `Bıḡ GLıḡb Zḡı aıv nḡḡḡQ| mıḡıḡZK KıR eḡḡ Gi ḡḡa` meḡḡıv Dcıḡvb
 LḡR cıv qı mḡe nḡe|

D`niY 1

evsj v GKıḡWḡx evıḡḡ mıvıvıY mfv (1998) Gi KıḡḡeeıYı cıW Kıtj Avḡıv ḡ`LḡZ
 cıB ḡh,

evıḡḡ Dbḡḡ Kıḡḡḡḡḡ (1997-98) GKıḡWḡx evsj vḡ`ḡkı ḡıḡḡḡı BıZıvıMḡḡ cıḡḡḡ
 I cḡKıḡ mḡıḡıḡGKıḡ cḡKı MḡıY Kḡı|

G cḡḡıı j ḡḡı Kıḡḡj?

ḡḡevıḡıv RıḡZı BıZıvıḡm G ḡveZKıḡḡı meḡḡḡ NUbı ḡıvḡ ḡıḡḡḡı ḡRjıııḡEK
 ZYḡḡ-ḡḡḡ ḡ`ḡK mḡMḡıZe` mḡḡ e`ıḡḡ BıZıvıı ıPbıvı Dḡıḡk` ḡıḡḡḡı BıZıvıı
 ıelḡK 64ıḡ Mḡḡ Ges ḡḡS-KḡıḡÜv, ıegvb evıvıḡ, ḡıḡvevıvıḡ I ıḡKḡıvıḡı ḡıḡḡḡı
 Ae`vb mḡıḡKḡ 4ıḡ Mḡḡ Ges evıḡıv RıḡZı Avıḡseıvı Z ḡḡZıv RıḡZı RbK eḡeÜz
 ḡkL ḡıḡRej ıḡḡıḡı Rıḡḡı Dcı ḡıZıvıvıK ḡıḡZḡAvḡıvKıḡḡı 1ıḡ Avḡıv evḡ G
 cḡḡıı Aaxḡḡ cḡKıḡ Kıvı jḡḡı ıbaḡıY Kıv nḡıḡ

cḡḡıZ cḡḡıj Z e`q KZ ıḡj?

meḡḡıḡ 163.00 j ḡḡı UıKıv|

cḡḡıı ḡḡıv`?

Rıvḡıvıx 1997 nḡZ ıııḡ2002|

Avḡıv Dcḡıı D`niYıḡḡZ ḡ`LḡZ cıḡḡḡ j ḡḡı, cḡḡıZ cḡḡıj Z e`q I cḡḡıı ḡḡıv`
 mḡḡÜ ḡḡZ mḡıḡ BıḡZ ıḡḡḡQ|

D`niY 2

ḡıḡqıḡUK ḡıḡıḡBıḡ Ae evsj vḡ`k ḡḡḡBıvıBḡKıḡıḡıḡıv Ae evsj vḡ`kḡḡ bıvḡK GKıḡ
 cḡRḡ MḡıY KḡıḡḡQ| G mḡḡÜ KḡḡKıḡ ḡḡ- Z`ı ıḡḡḡıḡ –

cḡRḡıı ıḡḡıvıvḡ: Encyclopedia of Bangladesh.

ḡḡ- Drcıḡ Z e`ı: evsj v ıḡıḡıḡıv

ḡḡ- cııPıj bıv mḡıḡ: ḡıḡqıḡUK ḡıḡıḡBıḡ Ae evsj vḡ`k

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|



c̄v̄t̄V̄v̄Ēi ḡj̄v̄q̄b- 5

- m̄s̄w̄v̄B̄ D̄Ēi c̄k̄æ

1. cḡR± tcḡc̄v̄R̄v̄t̄j i īf̄c̄t̄i L̄vi ḡt̄ā t̄K̄vb , īæZ̄c̄ȲAsk , t̄j v̄_ v̄t̄K?
2. Ḡv̄k̄q̄v̄i UK̄ t̄m̄v̄v̄B̄iLi th cḡR±w̄ eZḡvb c̄v̄t̄V̄ D̄v̄ni Ȳ w̄t̄m̄t̄e Dc̄v̄cb̄ K̄iv̄ n̄t̄"Q
Z̄v̄t̄Z̄ ḡḡf̄v̄el̄r̄ D̄r̄K̄ĪZ̄v̄i c̄v̄i K̄īb̄v̄ḡḡ b̄v̄t̄ḡ GK̄w̄ Ask̄ īt̄q̄t̄Q| GB̄ Āt̄k̄i
cḡqvRbxqZv̄ ēv̄L̄v̄ K̄īæb̄|

Z_`tidv`iW`ys tKŠkj

Df`ik`

GB civ tkfI Avcb —

- ◆ MtelYv KvRi Rb` gva`wgK Z_` msM`ni Dm mbr³ KiZ cvi`teb;
- ◆ MtelYv KvR e`euZ Z_` Dc`vcb c`xwZ eY`v KiZ cvi`teb Ges
- ◆ `xKZ.tidv`iW`ys tKŠkj c`qM KiZ cvi`teb|

MtelKtK th tKvb MtelYv KvRi vbhŷ nevi c`g c`tŷc nj tKvb c`ŷj Z ZÉ; e`e`v, c`xwZ, tKŠktj i gta` tKvb mxgve`xZv, Am`úYŷv AvtQ wKbv Zv mbr³ Kiv| mŷivis th tKvb MtelK MtelYvi c`wgK chŷq `xKZ.Rvbŷ, eB, tiKW[©],`ij j LtR tei Ktib th mgm`v vbtq wZvb KvR KiZ AvM`x tm m`útk`ev Gi m½ m`úwKŷ tKvb mgm`v vbtq ce`Zŷ mgŷq tKvb MtelYv ntq`Q wKbv, ntq`vKtj Zvi djvdj wK| GB mg`lc`qvrB AvtQ etj Avgiv Rvb, MtelYv KvR gva`wgK Zt`i e`envi I euj c`ŷj Z| Gme wewfbaKviŷY GKRb MtelKtK RvbZ nq wZvb Zt`i mÚv`b wK aiŷYi Drtmi KvQ hvteb, msM`xZ Z_` wKfite e`envi Kiteb Ges MtelYv w`tcvU[©] ev w`mxtmi gta` Z_`vej x wKfite msthrB Kiteb|

MtelK MtelYv KvRi mgm`v Ges thŷ³KZv wPvŷZ Kivi ci wewfbaetiKW[©], w`tcvU[©] Mfxi fite chŷj vPbv Ktib| GRt`b ZvK Zt`i Drtmi c`KwZ. wbaŷY KiZ nq| thgb ōc`bGvix wKŷw` mspvšI tKvb ce`Zŷ MtelYv KvR t`Lz ntj MtelKtK gqgbmstni RvZiq c`wgK wKŷv GKvWgxi MŠvMv`i thZ nte| MtelYvi c`KwZ. I Df`ik` eY`v Kti GRb` wZvb ce`ŷYB mskw` c`Zövb c`v`bi wBKU mivmvi ev MŠvMv`i Ki gva`tg t`c`i Z c`I ōviv MŠvMv`i e`envi i AbsvZ MhY Kiteb|

evsj v`k weMzKvj xb wKŷv MtelYv mspvšI Z_` msM`h KiZ ntj MtelK mvariYZ c`gB BANSDOC, BANBEIS, wKŷK c`kŷY gnwe`ij qmgfni MŠvMv`i Ges XvKv wekŷe`ij tqi wKŷv I MtelYv Bbv`wUDtUi MŠvMv`i mivv` MhY Kiteb| evsj v`k Dbŷ wekŷe`ij tq wR`^tKvb MtelYv ag`D`Pzi chŷqi wKŷv t`c`wG GLt`v Pvj yv ntj I Dbŷ wKlb c`xwZi Dci th mg`lMtelYv ntq`Q tm, tj v m`tU wKQyZ_` cvl qv hvte evDv`i MŠvMv`i |

miv`úZKKvtj th tKvb MtelK Kiv`úDvvi e`envi i ōviv Bvvi`bU, www, eŷDvRs miv`v gva`tg c`w`exi th tKvb t`k ev c`Zövb ntZ wR`^MtelYvi m½ m`úKŷŷ Z_` msM`h KiZ cvi`teb| Gi Rb` MtelKtK Kiv`úDvvi e`envi i gva`tg Bvvi`bU miv`v e`envi KiZ nte| GB e`e`v LiP m`tcŷ Ges chŷŷ I Kiv`úDvvi wbf` etj evsj v`k i wKŷv MtelYv tŷt` Gw GLt`v euj Rvwc`Zv AR[®] Kti bvB| mŷivis, evsj v`k i eZŷvb cvw w`ZtZ G Avtj vPbvq tKvb , iazc`yZ_` cvl qv hvte bv|

ḡ Ae GWKkb

Avġiv Rmb th, gvV chġq wbtR gva'wgK Z_ msMh KvR AskMhY Kivi cte^o
MtelKtK G m^otU Dch^o cŏwZ MhY KiZ nq| tKvb MšvMvi nZ tKvb cKwZi
Z_ msMh Kiv m^oe tm m^otU GKwU cŏwgK avi Yv msMh Kti cwi Kí bvi Abġvqx KvR
KiZ nte| bZev A_^o mgq Dftqib AcPq nZ cŏti; GB AcPq Averi gj-
cwi Kí bvi Dci tbiZevPK cŏve ivLte|

cKwKZ Z_ ev WKtU wtk- IY GKRb MtelKtK wKfite mnvh Kti?

- mgm'vi wKueZ^o ev mgag^o Ab'ib" mgm'v Ab" tKvb MtelK wK AvwZtK wtkdY KtiQb Zv Rvbr m^oe|
- mgm'wM' wcl qe'í AZxZ BwZnm msMh KiZ mnvh" Kti|
- tKvb cŏqvRbxq gva'wgK Z_ msMh Kiv m^oe|
- MtelYvi thšw^oKZv, Dfík", Z_ msMh Kvix hšMvcthMx, mWk, Kvhrí Z_ msMh KiZ mg_ q^otq^oQb wKbv Zv RvbtZ mnvh" Kti|

WKtU wtkdYi gva'g msikó mgm'wli AbġvubKZ Z_ msMh Kiv m^oe|

WKtU wtkdYi m^oav mgr wbgie/c –

- msMpxZ Z_ wMZKvj xb Zt_í mZ"Zv cŏZwZ Kti|
- cKġvj v, mvŋvrKvi BZ" w tKŠktj i gva'g msMpxZ Z_ Atcŋv G aitbi Z_ AwakZi wklmthvM" nZ cŏti|
- WKtU msŋŋB Ges Gi mnR e"enivcthMxZv itq^o|
- Z_ cŏqm thvM" Ae"vq cvl qv m^oe|
- Z_ AZ"šíAí A_ e"tq msMh Kiv m^oe|

MtelK Zvi MtelYv m^oúK^o, w_mxm ev wicvU^owKfite e"eüZ Zt_í Dm Dtj - L KiFeb?

Z_ cÄx wj wce^x Kivi AvšRwZK wKQybqg AvtQ| gj-Z`Bw tKŠkj ev cŏqv eüj e"eüZ|

GKwU cŏqvq cvtVi th"vrb Z_ w e"eüZ n^otq^o WK tmLvrbB tidv^oY wj wce^x Kiv nq, thgb –

cŏg tKŠkj

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

cW 7

MtelYv mᚦ fᚦKWtgv I cōZKiY

Dfīk

GB cW tkfI Avcb —

- ◆ MtelYv mᚦ fᚦcōZ Kivi ᚦKZ.KvVtgv eYᚦv KiᚦZ cviᚦeb Ges
- ◆ bgbv MtelYv mᚦ ᚦfᚦ gvaᚦtg ᚦZwi i ubqg ᚦPvYZ KiᚦZ cviᚦeb|

th tkvb KvᚦRi cwiKíbv chᚦq, cōwZ ceᚦBZᚦw i bᚦvq Dcᚦvcb chᚦq AZᚦšl
ᚦiāZcYᚦ MtelYv KvR Kivi cᚦeᚦthgb ᚦcᚦcivRij ᚦj LᚦZ nq, KvᚦRi mgq ᚦbvUeᚦ
ubqigZ ᚦj LᚦZ nq ᚦWK ᚦZgub KvRwU tkI nᚦq ᚦMᚦj mᚦ fᚦ ᚦiᚦcivUᚦ ᚦmᚦ AvKvᚦi
ᚦj ᚦL Zv gjᚦvqb KZEᚦᚦi KvᚦQ gjᚦvqb KvᚦRi Rbᚦ Dcᚦvcb KiᚦZ nq|

Povšl ᚦj Lb AZᚦšl ᚦiāZcYᚦGes gjᚦevb eᚦj B effective essay writing, effective
scientific writing Gi gZ KvᚦRi fivᚦ ᚦmᚦ ᚦj Lᚦbi ᚦKŠkj Avqᚦ KiᚦZ nq| ᚦmᚦ
ev Povšl ᚦiᚦcivUᚦ KZK ᚦj AvšRᚦmZKfivᚦ ᚦKZ.KvVtgv AvᚦQ| Avevi AᚦbK mgq
ᚦekᚦe ᚦᚦj q KZEᚦᚦ, AᚦcᚦvbKvix msᚦᚦ, MtelYv cwiPvj b msᚦᚦ ᚦbRᚦGKwU ᚦᚦkI
KvVtgv Abgvᚦi KvRwU Kivi ᚦᚦᚦ R ᚦᚦb|

Avgiv GB civV cᚦᚦj Z GKwU KvVtgv ᚦiāZcYᚦAsk ᚦj v mbr³ Kie|

mivavi YZ GKwU MtelYv mᚦ ᚦfᚦbgᚦj ᚦLZ Ask ᚦj ᚦvKᚦe —

- ᚦkᚦi vbg ᚦeᚦZ (title statement)
- thšw³ KZv (rationale)
- MtelYvi Dfīk (objectives of the study)
- AbvgZ ᚦmᚦvšl (hypothesis)
- MtelYvi mᚦgveᚦZv (limitation)
- MtelYv KvVtgv DchᚦZv (suitability of the structure)
- mgMŌI ᚦfšᚦmᚦj K AĀᚦj i eYᚦv (dification of the target area)
- ᚦwU ᚦbqšᚦ ᚦKŠkj I DCKiY (techniques and tools of identifying error)
- ᚦbᚦᚦᚦᚦMᚦZv I hᚦᚦZv mᚦvᚦKᚦ ᚦeᚦZ (statement about reliability and validity)

ᚦekᚦe ᚦᚦj q ev DᚦP ᚦkᚦv cōZōvᚦbi Avl Zvq th mgᚦl ᚦwMᚦgᚦx MtelYv KvR nq Zvi
Rbᚦ KZEᚦᚦ ᚦK bᚦwZ AbgvᚦY Kiᚦeb Zvi cōZKZ.ᚦᚦᚦbqgvej ᚦᚦ (regulation) KZEᚦᚦ
ᚦZix I Abᚦgvᚦ bceᚦ MtelKᚦ i ᚦbKU cōvb Kᚦib| MtelK/MtelK ᚦj GB ᚦbqᚦgi
Avl Zvq MtelYv KvR Kᚦib I ᚦmᚦ ᚦZix Kᚦi cixᚦᚦᚦYi Rbᚦ hᚦᚦ KZEᚦᚦi ᚦbKU
Rgv ᚦᚦb|

fıgKv

eZ@vb c@ZthvMzigj-K mf`Zvq th tKvb aiıbi MtelYv, `eÁvnbK cixŋıv-ıbixŋıv KırR cwi msL`ıfbi avi Yv, mF e`vcK nıfi e`eüZ nı`Q|

Ávb-ıeÁvıfbi Ab`ıv` kvLvi gZ ıKŋıv I gıbvıeÁvıfbi ıewfbetŋıfı cwi msL`ıfbi e`envi Acııııh`nıq tMıQ| cwi msL`ıv c×ıZ e`envi Kivi dtj ıKŋıv I gıbvıeÁvıfbi ıewfbekıLvi KırR `beŋı³K I ıeÁvb ıfıv³Kfıte Kiv mæ| thınZz cwi msL`ıv GKB mı½ cixŋıvgj-K I c@qıMgj-K ıeÁvb ZvB ıKŋıv mæÜxq MtelYv KırR Gi c@qıM AZ`sıdj cııf

Avgiv GB BDıbtııı ıewfbacetv ÜÜıKŋıv MtelYvüü KırR cwi Pıj bvi ıewfbetŋıfı th mg`ı cwi msL`ıvıfıE`K ııııme Kivi c@qıRb nq Zvi ga` t`ıK Dtj ıııııM` KıqKııııı e`envi ıKLe|

cıV - 1 mstk- 1

cıV - 2 mstk- 1v¼

cıV - 3 mstk- 1v¼ : ııazı; mıgıvexZv I ıııııı
c×ıZ

cıV - 4 mııııex mstkıv¼

cıV - 5 cııııııK I AcııııııK cwi msL`ıv : avi Yv

cıV - 6 KırB eMŋıU÷

cıV - 7 z-ıU÷

cıV - 8 t-ıU÷

cW 1

msfk

Dfik

GB cW tkfI Avcib —

- ◆ msfk i msAv c0vb KiZ cvi teb;
- ◆ msfk avi YwU e`vL`v KiZ cvi teb Ges
- ◆ ci`ui m`uK⁹ Pj tKi gta` m`utK⁹ gvIv tei Kivi c0qvRbxqZv e`vL`v KiZ cvi teb|

uk⁹ e`e`vi weifbaet⁹ Avgiv mevB weifbaew`K ubtq KvR KiuQ| Avcbriv tKD tkYxK⁹ uk⁹ ubtq⁹RZ, tKD uk⁹ c0vmtb KvR KiZQb| tKD Avevi uk⁹ I civ`m⁹ uba⁹Yi`vqZc0B, tKD ev cix⁹ cwi Pij bv, civ`cyK c0vkbv I gy⁹Yi KvtR e`l i tq⁹Qb| uK⁹ G mg`l tckvq ubtq⁹RZ c0Z`KtKB c0qk`⁹ Pj tKi gta` we`gvb m`utK⁹ c0vZ. I gvIv ubY⁹ KiZ nq|

thgb- c0⁹gK we`ij tqi uk⁹ i`vqZi`v⁹ uk⁹ i eq⁹mi m⁹ thb`⁹uk e⁹ v⁹meK nq tm⁹ tK`⁹ i vL⁹| Gt⁹ c0Z⁹ tkYxi c0Z⁹ uk⁹ eqm evovi m⁹ m⁹ k⁹ i xK e⁹ l thb Avbg⁹ZK n⁹ti nq tm Rb`⁹ eqm I D`PZvi ga`Kvi m`uK⁹ tei Kiv Z⁹ i`vqZi|

Avevi uk⁹ i`v⁹ m⁹g Lv`⁹ M⁹Y KiZ⁹ uk⁹ ev GtZ Zvi`⁹uk e⁹ v⁹meK Avbg⁹ZK n⁹ti n⁹ uk⁹, th uk⁹ i`v⁹ m⁹YtZ f⁹vj tm weAv⁹tl f⁹vj uk⁹, th eisjv e`vKi⁹Y`⁹ tm uK Bst⁹ e`vKi⁹YI`⁹ G mg`l i⁹ tK tLqj i⁹ tLb gva`gK ch⁹qi tkYx uk⁹ Ges we⁹l q uk⁹|

uK Kti tei Kiv nq Gme m`uK⁹

msw- o Z`⁹ msM⁹ Kti, we⁹kd⁹Yi gva`tg AvM⁹ e`v⁹ ev M⁹telK tei Ktib`⁹ m`uK⁹ Pj tKi ga`Kvi m`utK⁹ gvIv|

h⁹ i`⁹ Pj K Gi⁹fc nq th GK⁹Ui gvb cwi eZ⁹ Ab`⁹Ui gvb cwi e⁹Z⁹ nq (evto ev Ktg) Zte GB`⁹ Pj KtK ci`⁹ui m`uK⁹ ev correlated e⁹v nq|

msfk nj`⁹ ev ZtZwaK Pj tKi gta` mnMg⁹bi c0YZv|

civ 2

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 civV tRþbW msfkdv¼ wK Ges tkvb aiþbi PjþKi gta` msfkdv¼vKvi mætebv AvþQ Zv civVi tkfI mbr³ KiþZ mŕŕg ntqiuQ|

eZgub civV Avgiv `Bw mæúKŕy PjþKi ga`Kvi mæúKŕy gvÍv tei Kie|

th cwimsL`vbMZ parameter, mPK ev civvqZi mrvvth` `Bw mæúKŕy PjþKi ga`Kvi mæúKŕy tei Kiv nq ZvþK etj msfkdv¼ ev `Yv¼ ev coefficient of correlation (r)|

Avgiv hw` msfkdv¼K evj 00` Bw ci`úi mæúKŕy PjþKi gta` mnMgþbi cŕYZvŰ Zvntj Avgiv mnþRB eSþZ civuQ th GB mnMgb tgvUvgnw wZb aiþbi ntZ civi

- GKwJi evx i mvt_ AciuJi evx A_ev GKwJi nrtmi mvt_ AciuJi I nwm
- GKwJi evx i mvt_ AciuJi nwm
- GKwJi evx ev nrtmi mvt_ Ab`uJi tkvb evn`K mæúKŕy vKv|

Dctii wZb cKvþi gta` cŭguþK evj nte avvZþK msfkdv¼ | wZxquw nte FYvZþK Ges ZZxq tŕŕþT tkvb mæúKŕyB, A_ŕ r = 0|

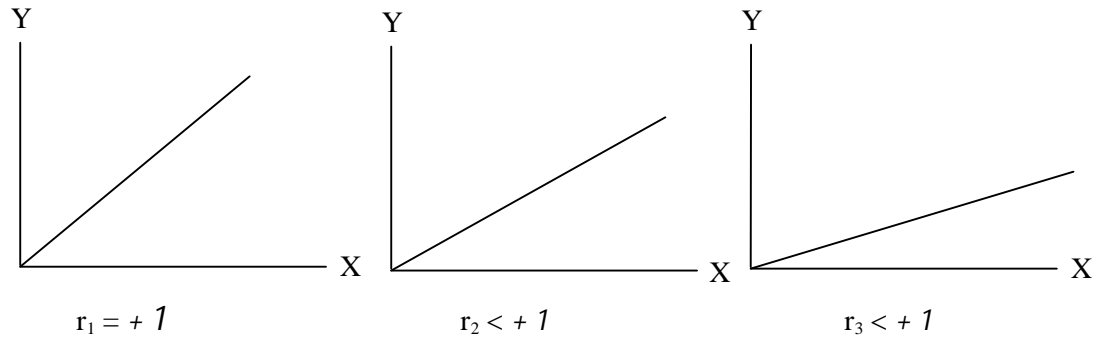
`Bw mæúKŕy PjþKi Dftqi civ eZB mggŕx (GKwJi evx þZ AciuJi evx, GKwJi nwm ntj Ab`uJi I nwm civl qv) ntj r avvZþK nte| Gi mtePP gvÍv nte + 1|

thgb- mæúZ CAMPE (Campaign for Popular Education) GK MfelYv cKvkbvi (Education Watch 1999) gva`tg RvnbþtþQ th, AmgavMŰ` civ evti cŭwgK wKŕv we`þti wZvgnvZvi AskMþY, weþkl Kþi gvtqþ` i fvgKv AZ`šimvqK|

A_ŕ Avgiv ejþZ cwii, cŭwgK wKŕvq wKŕv_ŕubeÜb msL`v evx i mvt_ mšþbi gvtqi avvZþK AskMþYi mæúKŕy mggŕx I D`PMvq (r avvZþK)| [Drm: The Daily Star 26þk AvM ÷ 099 ct 1 I 11]

ᄡ Ae GWKKb

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

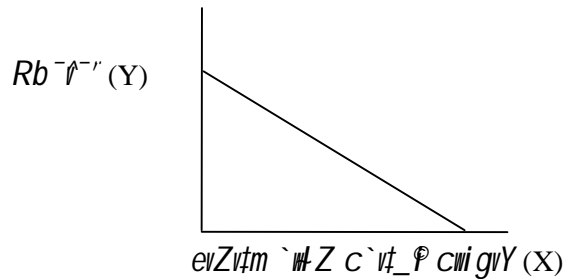


ᄡᄡ 5-2.1

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

cᄡᄡᄡᄡ x Ges y mᄡᄡᄡi evotQ A_ᄡ GLvᄡ r Gi ᄡvb +1| ᄡZᄡᄡᄡ x Gi ᄡᄡ y Gi ᄡᄡᄡᄡ; mᄡᄡᄡ r Gi ᄡvb +1 Gi ᄡᄡᄡ Kg| ZZᄡᄡ ᄡᄡ x Gi ᄡᄡᄡ Zᄡᄡᄡ y Gi ᄡᄡ AZᄡᄡᄡ|

tKvb ᄡᄡ Pj ᄡKi (mᄡúKᄡ) GKᄡᄡi cᄡᄡᄡᄡ ᄡᄡ Acᄡᄡᄡ ᄡecᄡᄡᄡᄡ cᄡᄡᄡᄡ NUᄡᄡ Zᄡᄡᄡ GB cᄡᄡᄡᄡᄡ Avᄡᄡ ᄡᄡᄡᄡᄡ ev FYᄡᄡᄡ mᄡᄡᄡ ᄡᄡᄡ cᄡᄡᄡ Kie| ᄡᄡᄡ evZᄡᄡ ᄡᄡᄡ cᄡᄡᄡ cᄡᄡᄡᄡ evotj Rbᄡᄡᄡᄡi Aebᄡᄡ NUᄡᄡ; Gᄡᄡᄡ r Gi ᄡᄡᄡ nᄡe FYᄡᄡᄡ|



ᄡᄡ 5-2.2

FYᄡᄡᄡ mᄡᄡᄡᄡᄡi Avᄡᄡi Kᄡᄡ Dᄡᄡᄡᄡ nᄡᄡ cᄡᄡᄡ –

bᄡᄡᄡᄡᄡ nᄡi evotj Aᄡᄡᄡᄡᄡᄡᄡ ᄡᄡᄡ nᄡi Kgᄡᄡ|

G mᄡᄡᄡᄡᄡ GKᄡᄡ Pj ᄡKi ᄡvb evotj mᄡúKᄡ Abᄡᄡᄡᄡ ᄡᄡᄡ Kᄡᄡ ᄡᄡᄡ; A_ᄡ GKᄡᄡᄡ cᄡᄡᄡᄡᄡ Abᄡᄡᄡᄡ ᄡecᄡᄡᄡᄡᄡ cᄡᄡᄡᄡᄡ NUᄡᄡᄡ|

tbwZeiPK mstk- #li t#t#T r Gi mte#P gvb nte -1| A_# `B#U Pj #Ki gta` r =
-1 nte h#r GB `B#U#i tKvb#UB Ab` tKvb eint ci#vg#Z #viv c#f#meZ bv nq Zte
G#`i ga`Kvi m#u`K#n#te c#Y#FY#Z#K|

`B#U Pj #Ki ga`Kvi FY#Z#K m#u`K#e`vL`vKvi#x#P#T 3-2.2 Gi Ab#j#c nte|



c#v#V#E#i g#j`#q#b- 2

- m#s#f#B D#E#i c#k#e

1. m#s#k#d#v#% ej #Z #K #ei#S#v#q?
2. m#s#k#d#v#%i c#K#v#i#f` #j L#y|
3. #m#s#k#d#v#%i g#v#I#v +1 n#Z -1 ch#S#O# GB avi Y#v#U e`vL`v Ki ab|

cw 3

mstkdv¼ : , iaZ; mrgve×Zv I vbYq c×wZ

Dfík

GB cvW tkfI Avcb —

- ◆ mstkdv¼i , iaZ;e"vL"v KitZ cvi teb;
- ◆ mstkdv¼ e"envi i mrgve×Zv wPwYz KitZ cvi teb Ges
- ◆ mstkdv¼ vbYq c×wZ e"envi KitZ cvi teb|

cġg`Bw cvV Avgiv mstkd m=ŧÜ cġwgK avi Yv jvf Kiv mn mstkdv¼i newfbzv cġ"ŧ KtiwQ|

GB cvV Avgiv mstkdv¼i , iaZ; tRtb mstK- l v¼ vbYqi KtqKw mF cġqvm Kiv wkLe|

ev`é Rxe tb newfbetckvq wbtqmwRZ e"ir³ Ggb Ae`vi m=ŧwb nb hLb Zvfk`ŧ ev ZtZmaK Pj tki cri`úwi K m=úK^qfei KitZ nq|

wkŧv e`e`vq wbtqmwRZ newfbæ"ir³eŧM^p newfbæaitbi djvdtj i KvhRvi Y wePri Kivi Rb" mstkdv¼ wntme KitZ nq|

ev`éŧŧŧ mstkdv¼ wntme Kivi cġqvRbxqZv Ab`xKvh^q D`vniY`ŧfc ejv hvg, 1999 mtj i AvM÷ gvtm Letii KvMŧR t`Lv tMj Ktmvfv AAŧj kwiš i ŧvi Rb" RmZmsN th kwišéwmbx tgvZvtqb KtiwQj tmLv tb evsjv`k cŧj k ewmbx t`ŧk tgvU EbcÁvk Rb cŧj k Avdmvi cvVv tv nŧqWj | GB kwišwgtb hvevi AŧM Zviv t`ŧk BstiwR fvvi`ŧŧZv wettq cixŧv w`tq DĒXY^qnŧqWtj b| wKš`ŧLRbK ntj l mZ" th, Ktmvfv AAŧj tġŧQ Zviv Avevi hLb cixŧv w`tj b ZLb Zv`i gŧa" Qwŧ k RbB DĒXY^qnŧZ cvi tj b bv|

Avgiv ejtZ cwi GB`Bw cixŧvi djvdtj i gŧa" mgZv tbB etj B GB Qwŧ kRbŧK e`_gŧbvi_ nŧq t`ŧk wdti AvmŧZ nj | [Drm: The Daily Star m=úv`Kix 14 AvM÷ 099] A_ŧ th me e"ir³ t`ŧk cixŧvq fij dj KtiwQj b Zviv mevB Ktmvfv wMŧq GKB cġwzi cixŧvq fij KitZ cvi b bvB| Avgiv ejtZ cwi bv th evsjv`tki cixŧvq fij Kitj B Ktmvfv cixŧvq| fij Kiv m=ŧ nŧqWj |

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 t0vrbv iki t`i %		
220	cKZ	cZ`mkZ	cv`R`	cKZ	cZ`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 cZ`mkZ msL`vi gta` FYvZK m0K0 Avgv`i t`tki Rb` AZ`Smlyei |

WK GKBfite ej v hvq,

Unicef th cmi msL`v fivEK 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 Pvj tq hvq Zv`i kZKiv nvi gvT 35 nI qvi K_v vQj WKS`cKZctqj c0`ugK ukqvvi c0Z gv-eiev Avf fivtKi mtPzbZv teto tMtQ, cmi tek Abkj ntqtQ, c0`ugK ukqvvi mshvM mjev avx Kiv ntqtQ etj B cKZctqj c0Z 100 R#bi gta` 46 Rb iki cAg tkYx chS covi bv KitiQ| GLv#b cZ`mkZ (35) Ges cKZ. msL`v (46) GB `BvUi gta` cv`R` 46 - 35 = + 11 Avgv`i Rb` Akven|

Gevi Avgiv iki gZzi nvi I cAg tkYx chS t0vrbv iki i cKZ. msL`v ch0j vPbv Kiti ej tZ cmi iki gZzi nvi Ktg hvI qvi mvt_ mvt_ iki c0`ugK ukqvvi nvi avx tctqtQ| GLv#b evn`Z GKW FYvZK m0K0 t`Lv hv`Q; Aek` GtPtq GB FYvZK m0K0 Avgv`i Kvg`|

Avgiv Dctiv³ Z`_ t`tk t`Ltz cwrQ-

- WRGbw avx i mt1/2 cvB eQti i Kgeqmx iki gZzi nvi FYvZK
- WRGbw avx i mvt_ cAg tkYx chS t0vrbv iki t`i kZKiv nvi avvZK|

Dcti i KtqKW D`vni Y t`tk Avgiv eStZ cvijvg RbRv#bi tPtq m0K0 `Bv Pjtki gta` m0K0 L`R tei Kivi ht_0 c0qvRb itqtQ|

gtb ivLtz nte -

mvgvexZv

- `Bv m0K0 Pjtki gta` mstk0 cmi jvqZ ntj B vbw0Z ntq ej v hvtebv th, Gt`i gta` miz`Kvi At_ m0K0 itqtQ|
- mstk0 v1/4 we#k0 Y Kivi dtj Avgiv i avvT GB `Bv Pjtki ga`Kvi mnMgb m0tU avi Yv cvB WKS`cmi eZ#bi tKvb Kvi Y m0tU Z`_ cvB bv|

Ge GWKkb

- MmYwZK cġuqvq cġB `Bw Pj tKi gta` mstkd v¼ we`gvb_vKtj l tKvb tKvb tġtġ t`Lv hvq th, Gt`i gta` cġZ.tKvb mnmúKġtbB| A_ġ wntme Kti th msL`v cvl qv hvq Zv memgq cġZ.ġPġ ijcwqZ Kti bv|

Gevi Avgiv wbyġ c×wZ wkLe|

`Bw múKġ Pj tKi ga`Kvi mútkġ gvġv tei Kivi Rb` mvariYZ Kyjġ wcvimtbi mġB e`eüZ nq| GB mġw wbgġc –

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

D`niY

gtb Kiab, GK eB weġZv `Bw weL`vZ tj LġKi `Bw eB-Gi weġtqi gta` tKvb múKġAvġQ wKbv Zv tei KiġZ Pvb| wZwb `k w`tb GB `B e`wġi eB `Bw th msL`vq weġu ntġtQ Zvi GKw Zwiġ Kv cġZ KtiġQb| Zwiġ KwU wbgġc –

w b	weġZ eB-Gi msL`v	
	tj LK ŐKl	tj LK ŐLl
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`vKvġbi gvwiġ K wbtPi gv_b,tj v wntme Kti tei Kiġeb|

$\sum XY$

$\sum X^2$

$\sum Y^2$

wbtPi mvi Yxi (5.3-1) gta` wZwb gv_b,tj v emġtj b –

X	Y	XY	X ²	Y ²
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

Գտնել ռեգրեսիոն գծի հարմարեցման աստիճանը և թիվը

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

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

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

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

Ռեգրեսիոն գծի հարմարեցման աստիճանը և թիվը գտնելու համար հարկադրված է օգտագործել հետևյալ բանաձևերը՝

Ռեգրեսիոն գծի հարմարեցման աստիճանը և թիվը գտնելու համար հարկադրված է օգտագործել հետևյալ բանաձևերը՝

Արդյունքում հարկադրված է օգտագործել հետևյալ բանաձևերը՝

Գտնել հարմարեցման աստիճանը և թիվը հետևյալ տվյալների համար՝

Իր	ԴՊԶ	ԻՐ
K	31	17
L	27	18
M	29	16
N	31	22
O	32	22
	30	19

Geçirgenin Gözlemleri

Giriş ve Sonuçları

Giriş ve Sonuçları

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

Giriş ve Sonuçları

	xy	x ²	y ²
K	-2	1	4
L	3	9	1
M	3	1	9
N	3	1	9
O	6	4	9

Giriş ve Sonuçları

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

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

Giriş ve Sonuçları



cvfVvEi gj`iqb- 3

• **mgm`vgj-K ckae**

1. mstkdv¼ r intme Kivi gva`tg mn-mauKfjy `Bw Pj tKi wk aiþbi mauK`fei Kiv mae?
2. `kg tkYxi gwmK cixflvq ibtge³ `kRb meflcflv `gfl wkflv`PmWYZ I c`v`© weAvtb ibgiefc baf tctqtQ| Avcwb t`Ltz AvMbx 00hvin MwYZ `gfl Zviv mvariYZ c`v`©weAvtbl `gfl00 GB cca` GLvþb KvhRi wkbv| MwYZ I c`v`© weAvtbi bafii gta` mstkdv¼ tei Kiab|

		wkflv`fl tivj 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

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

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

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

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

Avcwb ati wbtZ cvtib GB `kRb wkflv`PAsTK `gfl etj c`v`©weAvb mel tqI `gfl00 GB cca` tgvUvgw mZ` (AsZ GB mefkl cixflvi tflfT)|

civ 4

mwi ex mstkdv¼

Dfík

GB civ tkfI Avcwb —

- ◆ mn-múKñy Pjtki MwyZK gvb e'envi e'wZitk wK tkŠktj mstkdv¼ tei Kiv mæ Zv e'vL'v KitZ cviþeb|
- ◆ p ev mwi ex mstkdv¼ tei KitZ cviþeb Ges
- ◆ p Gi mxgve×Zv wPwýZ KitZ cviþeb|

wKñv tñtñ AþbK mgqB wKñKþK Zwi wKñv_ñ eyx, mZZv, AbjwM, AvMñ ubtq KivR KitZ nq| wKŠ' G mg'í 'enkó' mbv³ Kivi tñtñ cixñv MñY Kti cixñvq baf t' lqv Lg Kwv| Zte wKñK wKfvte wKñv_ñ AMñwZ j ñ' Kiteb?

th mg'íPjtki miwmi gvb t' lqv mæ nt'Q bv, wKñK GB cKwzi `Bw mæúKñy Pjtki cvi'úwiK mæútkP gvT'v tei KitZ PvBþj mwi ex mstkd- l ev i'vsK-mæú c×wZ cñqvM Kiteb|

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

KihexwZ

gþb Kiab, Avcwb wKñv_ñ tgav, wPññYZv, e'enviK KvþRi `ñZv Gme ubtq KivR KtitQb| G mg'í, YvejþK e'w³ wtkþli tñtñ tkYxKiY Kiab| A_ñ

- Avcwb 1, 2, 3 BZ'w` AbywgK mSL'v e'envi Kti c`mgþni wfwÉµg ev rank w'í Kiab|
- `Bw mæúKñy Pjtki cñZ'KwU cþ'i wv'ð 'enkó'i mitctñ µg Abyvqx `Bw Ae'vb civl qv hvte|
- Ppovšlchñq µg Abyvqx Ae'vþbi `Bw tkYx cñZ Kiab|
- Gevi Spearman's rank correlation coefficient Gi mñ e'envi Kti Avcbvi wPwýZ PjK `Bwli gþa' Dcw'Z mæte' mæútkP gvb (p) tei Kiab|

p Gi mñ

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

GLvþb, $\rho =$, YvbywgK mstkdv¼ (ev mwi ex)
Gg GW tcnñg

$$N = MYmsL\ddot{v}$$

$$d = c\ddot{Z} tRvov \mu\ddot{g}K b\ddot{a}t\ddot{i} i g\ddot{t}a\ddot{''} c\ddot{v}_R\ddot{''}$$

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

1998 uk`vve t`ei Dveoi` q Ae GWKkb Gi weGW tcMttg tKvb GKUU ÷vVV tm>Uvti uk`vbmZ cwi i PivZ I gtbveAvb cwi i PivZ tKvm` Bui iUDUi uk`v_ i GB tKvm`B` Bui KvRi mveavi Rb` GB` B iUDUi gvI` kRb uk`v_ tetQ vbtj b| GKUU BDvb tUi Dci tgSLK ckKittj b| cti vZvb uk`v_ i tevaMg` ZvtK vbgieftc muigK b` i` t j b -

uk`vbmZ cwi i PivZ	gtbveAvb 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 iUDUi t`L tZ Piv`Ob uk`v_ GB` Bui tKvm`B-Gi` Bui avi Yv m` tU th e`vL`v i` t`Q Zvi g`ta` tKvb Avst`m`uK`AvtQ uk`v|

ranking Kivi mgq GB` B iUDUi gv_ t j vi Avt`v`K f`i i K_v g`b i vL t j b| dtj G` i ranking mvi YUU vbtPi gZ nte|

t i v l s t` j		i` i s v k s t` j		d ²
uk`vbmZ	uk`v gtbveAvb			
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

$$\Sigma d^2 = 102.50$$



ciVvEi gj`vqb - 4

• msuB DEi ckae

1. ρ Gi MmYwZK mF`ij Lk Ges c` ,tj vi A_`eYBv Kiab|
2. ρ Gi gvb + 1 ntj

Spearman-Gi mF`i $\sum d^2$ Gi gvb KZ nte?

3. tKvb GKwU cveij K cixqivq BstiuR I eijsv mel`tq 100 bafii `beq`K cixqivq 12 Rb cixqv_`p`btgme` baf` tctqtQ| ukqv_`i GB `BwU mel`tqi bafii ρ tei Kiab|

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

3. mgvaib

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

X baf`	Y baf`	X Ae`vb	Y Ae`vb	d = X _A - Y _A	d ²
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
					$\sum d^2 = 41$

$$\begin{aligned} \rho &= 1 - \frac{6 \sum d^2}{N(N^2 - 1)} = 1 - \frac{6 \times 41}{12(144 - 1)} = 1 - \frac{246}{1716} \\ &= 1 - 0.143 = 0.857 \end{aligned}$$

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 MteIK` i ciVgwiK I AcivgwiK Dfq cKv`ii cwiMSL`v`bi ht_ó e`envi KiZ nq| GB cvfV Argiv GB `B cKv`ii cwiMSL`vb e`envi msµvšI wKQyAvtj vPbv Kie|

ciVgwiK tU÷ nj tm ai`bi tU÷ thLv`b MteIK 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`tgšuj K kZ`hLb c`Y Kiv m`e nq i`agv` ZLbB MteIK G ai`bi tU÷ e`envi KiZ cv`ib|

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`f, 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`UbgŸ ev distribution free| χ^2 ev KvBeM`fU÷ nj AcivgwiK tU÷ i g`a` euj e`eüZ GKw|

Argiv cieZ`cW_`tj v`Z G mg`l`tU÷ ubtq w`lwi Z Avtj vPbv cie| Geri t`LŸ GB `B cKv`ii tU÷ i gj` cv`R`|

OK 5-5.1: cívgnîK I AcívgnîK tU÷i cv_℞mgn

cívgnîK	AcívgnîK
<ul style="list-style-type: none"> • th ubtekb nîZ bglyv mSMh Kiv nq Zvi cKwZ. Rvbn _vKîZ nte • mgMhKi gvîv mætÛ KZ,uj weþkl AbgyvZ ev assumption _vþK • AcívgnîK tU÷i tPþq kw³kij x 	<ul style="list-style-type: none"> • th Z_`iek! nîZ bglyv mSMh Kiv nq Zvi parameter ev gvîv mætÛK®tKvb mþw`® kZ®_vþK bv • AcívgnîK tU÷ KZ,tjv AbgyvZi Dci wbfþkij nþj I G,tjv cívgnîK tU÷i gZ Rulj AbgyvZ bq • e`envi Kiv mþearRbK • tU÷ cðqvM mi cwi va cívgnîK tU÷i tPþq e`vcK • MwyvZK wmwve cívgnîK tU÷i tPþq mij

cívgnîK tU÷ e`envi KiþZ nþj bglyv cKwZ. wbgie/c nîZ nte –

- `vaxb ev Abþc¶ chþe¶¶Y|
- chþe¶¶Y,tjv `vfweKfvte ewUZ Z_`iek!nîZ mSMh KiþZ nte|
- th me Z_`iek!nîZ bglyv mSMh Kiv nte Zv`i tþ`v¼ GKB nîZ nte|
- Pj K,tjv AbgyvZ wfvEK t`þj cKvk KiþZ nte|

cívgnîK tU÷ cðqvM Kiv mæe bv nþj wbtgæ³ t¶þî AcívgnîK tU÷ cðqvM Kiv Pþj –

- Pj K,tjv bvgwfvEK cwi gvc mþvšmsL`vq cKvKZ nþj |
- Pj K,tjv µgwfvEK cwi gvþci wfvEKZ cKvKZ nþj |

GB cþV Avgiv cívgnîK I AcívgnîK tU÷ mætÛK®mvaviY aviYv jvf Kijvg| cieZþcv,þj vþZ GþK GþK z, t, F Ges χ² tU÷ mætÛ Avþj vPbv _vKþe|

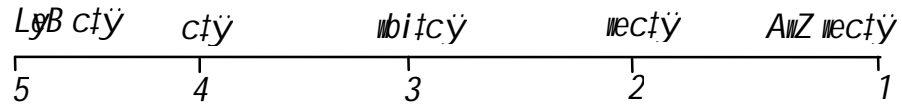


cþVvEi gj`vqb - 5

- msv¶B DËi cKæ
- 1. cívgnîK I AcívgnîK tU÷i gþa` cævb cv_℞`wK?
- 2. cívgnîK I AcívgnîK Dfq cKvi tU÷i GKw Kþi D`vniY w`b|
- 3. cívgnîK tU÷i `enkó`mgn Dþj L Kiab|

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 ct`q ev wect`q Zvt`i gZ w`tZ ejv ntjv | GB weewZi Rb`



Dctiv³ t`fj i cuBnU gvIv ntZ GKUW vPvYZ Ki tZ ejv ntjv |

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

Abtc`q cE`A hvPvB

hLb tKvb GKUW Pj ev Pj K Aci tKvb Pj K 0vrv cFvmeZ nq bv ZLb ZvtK Abtc`q cE`A etj | G aitbi cE`Ai t`q`T Kvb eM`U ÷ `Bv Pj tKi gta` m`utK` gvIv cii gvc Kti bv; eis tKvb `e ubqvgK ev bgbvRvbZ T`vUi Kvi tY `Bv Pj tKi gta` th AvcvZ m`uK`cZxqgvb nq Zvi GKUW Abgvb c0vb Kti |

Abtc`q cE`A m`uK`v DcvE` vbtq Kvr Kivi mgq DcvE`K KbiUbtRbvm tUvetj mvrvtZ nq |

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

Gevi Avgiv `B GKUW mnR t`q`T Kvb eM`U ÷ e`envi Kie |

D`niY 1

Aog tkYx civk 150 Rb uk`qv`K 00veAvb00, 00emvR`00 Ges 00Kj v00 vZbnu fvtMi gta` tKvb fvMvU tZ Zvrv cotZ B`QK ckaKiv ntj Zvrv vbgv`c DEi Kij |

	veAvb	emvR`	Kjv	GLv`b fo nt`Q ch`ev`qZ vdt`KvtqYx
fo	35	55	60	

gtb Kiab, uk`qv`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 Pv b |

Gt`q`T χ^2 tU ÷ e`envi Kti

00uk`qv`i M`c cQt`i gta` A_`en cv_`R` AvtQ uksev tbB GB cE`A hvPvB Kiv m`e |

ḡ Ae GWKkb

Avḡiv t`L tZ cwrQ, fo ev chḡerḡZ wdtKvtqYx t`I qv AvtQ|

Avḡiv`i fe ev cZ`mkZ wdtKvtqYx tei Ki tZ nte| 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) ²	$\frac{(fo - fe)^2}{fe}$
weÁvb	35	50	- 15	225	4.5
ewYR`	55	50	5	25	0.5
Kj v	60	50	10	100	2.0
ḡgW					7.0

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

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

`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 χ^2 Gi μ 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 GKv e`eüZ nq|

Avḡiv eZḡv cixḡḡYi tḡḡḡ 0.05 A_ḡZvi ḡvḡv e`envi Kie| GB ḡvḡvq `ḡaxbZv ḡvḡv 2 Gi Rb` χ^2 Gi μ ḡḡḡv nj 5.99|

χ^2 Gi cḡB ḡvḡ 7.00

μ ḡḡḡv ḡvḡ 5.99

\therefore cḡB ḡvḡ (7) > μ ḡḡḡv ḡvḡ (5.99)

thtnZzumišgvtbi tPtq cŮB gvb eo ZvB Avgiv ej e

Māc cQḥ`i e`vcvḥi iḥḥv_ḥ`i th gZvgZ Avgiv t`Ljvg Zvi gḥa` A_ēn cv_R`
iḥḥḥQ|



cvḥVvĒi gj`vqb - 6

- **msmḥB DĒi cĶæ**

1. χ^2 tUḥ÷i gva`tg tKvb aiḥbi Z_` cĶvk Kiv mæe?
2. χ^2 tUḥ÷i gvb hiv` A_ēn nq Zḥe mætebv cĶí mæúḥKḥKvb aiḥbi iḥḥḥḥMḥxZ nḥe?

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 bglyv ġbtq Avciub Kvr KiTQb| Avcbri gtb ckeRvMtz cvi th, GB `BwU bglyv ĠK GKB aiġbi? GKB aiġbi bglyv ntj `BwUi MoB GK nte| hw `BwU Mo gvtbi gta" cv_R" t`Lv t`q ZLb MtelK ġntmte Avciub ĠK Ki teb? Kvi Y, `BwU bglyv 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 bglyv `j ġbtq hLbB tKvb MtelK Kvr Ki teb ZLb ZvtK mtpZb nTZ nte th, `BwUi Mo gvtbi gta" A_@n cv_R" AvtQ ĠKbv| th aiġbi cvi mvsuL`K tU÷i gva`tg GB ġm×všf MhY Kiv mæe Zv nT`Q z Ges t tU÷|

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

z tU÷ e`envi i GKwU , iazcykZġtqtQ-

- Z_`iek! nTZ `e bglyvqbi gva`tg bglyv `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 MhZ
 `BwU bglyv `tj i Mtoi gta" cv_R" ġBYġ Kti |

GLvfb, M₁ = 1g bglyv `tj i Mo

M₂ = 2g bglyv `tj i Mo

SE_D = `BwU bglyv Mtoi (M₁ | M₂) cv_ġK"i cĠvY Ġaw (standard error)

ḡ Ae GWKkb

cḡtg SE_D tēi KiḡZ nḡe –

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

Gēvi z ḡnmve Kiv mḡe/

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

z-Gi Av`kḡmvi Yx nḡZ t`Lv hvḡe cḡB gvb (2.27) 1% gvḡvq A_ḡn/

mḡivs veÁvb I gvbveK Mḡci eB, ḡjvi kḡ msL`vi gḡa` A_ḡn cv_R` iḡḡQ/



cvḡVvḡi gḡ`vqb- 7

• msḡḡB Dḡi cḡḡe

1. MḡVvḡK mḡm`v: ḡbḡPi mvi YḡZ GKB eqḡmi 50 Rb evj K I 50 Rb evḡj Kvi Mo D`PZv I Av`kḡePḡZ Dḡjḡ Kiv nj | evj K I evḡj Kiv`i Mo D`PZvi gḡa` tKvb A_ḡn cv_R` AvḡQ ḡKbv Zv ḡbYḡ Kiḡb/

	D`PZv (tmg)	Av`kḡePḡZ
evj K	152.8	6.3
evḡj Kv	150.2	6.6

- z -Uḡ÷i cḡqvḡMi cḡeḡKvb kZḡi cḡZ tLqj ivLḡZ nḡe?
- z -ḡU÷ KLB Ges ḡK cḡKvḡi tḡḡḡ e`envi Kiv nq?
- z -ḡU÷ e`envḡi GKḡU mḡgve×Zv Dḡjḡ Kiḡb/

cW 8

t-tU÷

Dt`ik`

GB cW tk`tl Avcwb—

- ◆ t-tU÷ i Dc`thvMzV eYŷv Ki`Z cvi`teb;
- ◆ t-tU÷ cŃqvt`Mi t`ŋŋŦ Dt`j L Ki`Z cvi`teb;
- ◆ wfbræagŋq `tj i Rb` t-tU÷ i mŦ-ŋj L`Z cvi`teb Ges
- ◆ mn-m`úKŋŷ `tj i t`ŋŋŦ t-tU÷ i cŃqvm t`Lv`Z cvi`teb|

Avgiv tR`tbuQ GKB Z_`wek!ev population n`Z `Bv`ti hLb tKvb MtelK ev MtelK
 `j c`K bglyv Pqb Kti tKvb Mtel Yv dj civb ZLb mrvavi YxKi`Yi gva`tg Zviv ŋm
 dj ev m`všH Z_` wek!i cŃZuW tgsj ev unit Gi Dci cŃqvm Ki`Z Drmŋ nteb|
 ŋKš` MtelK `j`K G Kv`Ri Rb` GKvU cixŋY Ki`Z nte— ŋbŋŌZ n`Z nte th,
 `BvU bglyvi Mtoi gta` tKvb A_`en cv_`R` AvtQ ŋKbv| A_`en cv_`R` _vKtj ejs
 ŋb`Z nte `j `BvUi MVb GKB iKg mgmE` ŋQj bv|

bglyvi AvKvi 30 Gi tPtq tQvU ntj t-tU÷ e`envi Kiv nq|

t-tU÷ i mŦ-ŋj ŋbgæfc —

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

th `BvU `tj i Mtoi ga`Kvi cv_`R` A_`en ŋKbv cixŋY Kti t`Lv nte Zv`i AvšŦ
 m`úK`Abynti SE_D wfbræte| GB AvšŦm`úK`Zb cKv`ti i n`Z cvi`teb —

- mn-m`úKŋŷ
- Abt`cŋ
- mgKŋ

ŋb`P cŃZuW `tj i Rb` SE_D Gi MVb cŃvb Kiv nj—

mn-m`úKŋŷ `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_D nte –

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

mgKḡ ḡ Gi tḡḡ SE_D nte –

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

GB ḡ ḡ tjvi ḡfc tKgb Zv tRtb tbB Avgiv|

mn-máúKḡ ḡ ej tZ tm aitbi ḡ tevSvq hvḡ i gḡa th wclq ev ḡḡKi Kvḡḡ t-tU ÷ cwi gvc Kiv nte tm wclq cḡZ tRvovi gḡa ḡKQycwi givY mn-máúKḡ_ḡK|

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

mgKḡ ḡ nj tmB ḡḡU ḡ hvḡ i tgḡj msLḡv mgvb nte| A_ḡ wclq tKvb wcltqi cixḡḡvq cḡB bḡḡi wcltZ mgKḡ ḡ MVb ntj GK ḡḡi cḡZḡK eḡḡi mgKḡ eḡḡ Ab ḡḡ_ḡKtZ nte|

Avgiv GB cḡV i agvḡ mn-máúKḡ ḡḡi Rb t-tU ÷ i cḡḡM t`Le| cieZḡZ evḡK ḡḡv Avcbviv wcltRivB eḡḡvi KḡtZ cvḡḡb|

mn-máúKḡ ḡ

Avgivḡ i KvḡQ wcltPi mviYxi gvaḡg ḡKQyMwYwZK Z_ i tḡḡQ| G_ḡjv eḡḡvi Kḡi Avgivḡ i PwYZ ḡKḡḡ_ḡ ḡḡi cḡḡK cixḡḡv | Ppvi cixḡḡvq cḡB bḡḡi Mḡoi gḡa tKvb A_ḡn cv_R AvḡQ ḡKbv Zv LḡR t`LḡZ nte|

	cixḡḡv	
	cḡḡK	Ppvi
ḡKḡḡ_ḡ msLḡv	20	20
Mo t`vi	M ₁ = 36.30	M ₂ = 40.60
Avḡ kḡePwZ	s ₁ = 4.50	s ₂ = 2.30
mḡk- 1v¼	r = 0.80	

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

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

cŭtg 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 wPy (-) AMŭn Kiv Ptj |*

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

μwšgvvbi mvt_ Zjv Kivi AvtM raxZv gvŭv ev degrees of freedom tei KitZ nte |

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

19 raxZv gvŭv 0.05 t Gi μwšgvv nj 2.093 |

t Lv hvvQ, wntmtei dtj cŭb gv 3.02, μwšgvv 2.093 Gi tPtq eo | ZvB Avgiv wvšvšvbtZ cwi th, GB 20 Rb wkvŭv Dtj LZ wltqi cŭwK I Pwšvcvŭv cŭb bvti Mtai gta A_en cv_R itqtQ |



cvVvEi gj'iqb- 8

A) msuŋB DEi cŋæ

1. mn-m^uKŋy ᄡj i tŋtŋ: unme Kivi mgq ᄡaxbZv gvŋv uKfite uBYŋ Kiŋeb?
2. mn-m^uKŋy ᄡj ej tZ uK eSvq?
3. ᄡu ᄡj i Mto t'ŋi i gta" A_en cv_R" _vKtj uK eStZ nte?

Av) MuvvZK mgm'v

uŋPi mvi Yxi Z_ " AeJ ŋt b t Gi gv b 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) MuvvZK mgvaib

cŋtg SE_D tei KiŋZ nte

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

Av`kŋmvi Yx nŋZ μmsŋgvb LjR tei Kivi Rb" Agvŋ` i ᄡaxbZv 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 μvιś gvb 2.95|

ινmveKZ.t Gi gvb 1.09|

t` Lv hvτ`0, ινmveKZ.gvb 1.09 μvιś gvb 2.95 Gi tPτq tQvU|

mZivs, ejv Pτj th, `g `tj i cixΓvi bτii Mtoi gτa` th cv_R` itqτ0 Zv A_@n
bq|

cW 9

F-tU÷

Dჭიკ

GB cW tkქl Avcwb —

- ◆ F-tU÷ i cჭqvRbxqZv e`vL`v KiქZ cvi teb;
- ◆ მკწv MtelYvi tწქქ F-tU÷ i cჭqvM ქ`LvZ cvi teb/

civgmქK ev parametric tU÷ mgქni gქa` χ² mქქU AvქM Avქj vPbv nქqქQ/ F-tU÷ Avი GKwU civgmქK tU÷ | GKB Z_`mek; nქZ msMpxZ bgქvi tწქქ hLb gvქ `ჭwU bgქv `j Mvb Kiv nq ZLb GB `ჭwUi Mქoi cv_ქK`i gvქv მbijcY Kivi KvქR t-tU÷ ev z-tU÷ e`envi Kiv nq/ bgქv `j `ჭ Gi AwK nქj F-tU÷ e`envi Kქi gvქv მbijcY Kiv mქe/

F-tU÷ i gva`tg gj-Z tწ`v¼ meქ- IY Kiv mქe/ cჭtgB Avgiv tRქb tbB F AbქvZ KvქK eქj |

GKB Z_`mek; nქZ msMpxZ `ჭwU bgქv `ქj i tწ`v¼ i AbქvZქK eქv nq F |

gtbKwi, tKvb GKwU Z_`mek; hvi tწ`v¼ nქPQ σ² nქZ bgქv msMქn Kქi `ჭwU `j Mvb Kiv nj hქ`i tწ`v¼ S₁² Ges S₂² | hw` bgქv msMქn tKvb ႁwU bv `vქK Zქe Avgiv eქქZ cvi e th bgქv `ჭwU ci `úქi i Abქcწ

$$A_წ S_1^2 = \sigma^2 = S_2^2 \quad A_წ S_1^2 = S_2^2$$

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

t`Lv hქ`Q, hw` S₁² = S₂² nq Zქe F = 1 nქe/ Zქe ev `e Ae`vq S₁² ≠ S₂²

tწ`v¼ i gvბ 0 (kb`) nქZ ∞ (Amixg) chქl nქZ cvi |

წaxbZv gvქv

cჭg bgქv `ქj tგქj msL`v (item number) N₁ Ges wZixq bgქv `ქj tგქj msL`v N₂ nქj წaxbZv gvქv nქe:

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

A_წ N₁ = 10 Ges N₂ = 10 nq Zქe F AbქvZi 9 წaxbZv gvქvi GKwU j e tწ`v¼ `vKქe Ges 9 წaxbZv gvქvi GKwU ni tწ`v¼ `vKქe |

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

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

D`niY

gtb Kwi tKvb GKw Z`nek!ntZ Avgiv 5 AvKviti i (N₁= N₂ = 5) `Bw bgbv c0Z Kijvg| GB `Bw `tj i tf`v¼ tcjvg h_vµtg S₁² = 1.95 Ges S₂² = 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_@r s₁² I s₂² 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 S₁² = S₂² ntj F Gi gvb KZ nte?
4. n₁ = 10 n₂; Ges S₁² = 10.33, S₂² = 2.33 ZLb F Gi gvb KZ nte? `raxbZv gvIv tei Kti Av`k@v mviYx ntZ F AbgvZi µwšgvb tei Kiab|

მთელი Yv KvტR KიუúUჭi i e`envi**ფიგKv**

KიუúDUvi gj- DcKiY abacas t_ტK DტV Gტm AvayბK Rxeb e`e`vტK mუúYჭc
 უბqšY KiტQ| Rxebi Ggb tKvb Pri Yტქტტ tbB thLvტb KიუúDUvi e`eúZ nტPQ bv|
 KიუúDUvi thgb Rxebi DrKIღv eჟx i jტქტ" უბტqმRZ tZგub მტelK KZR.
 cუი Pmij Z მტelYvi gj- j ტქტ" nj გvbe Rxebი უეწfbეტქტტ Ae`mbK DrKIღv eჟx
 Kiv| mჯivs AZ`šl`ტწmeKfიტეB eZგub hჯMi მტelK Zუი მტelYv KvტR KიუúDUvi
 e`envi Kiტeb|

GB BDიბტUi KტqKიU cvტV Avgiv მტelYv KvტRi უეწfbეტ`ტი KიუúDUvi უK aiტbi
 Ae`vb ivLტQ Zv Avტj vPbv Kie|

cvW - 1 მტelYv KvტR KიუúDUჭi i e`envi
 cvW - 2 მტelYvq KიუúDUvi cუი Ki ბv
 cvW - 3 KიუúDUvi I მტelYv Z`"

cW 1

MtelYv KvR KivúDUvii e`envi

Dʻik

GB cW tkʻl Avcb —

- ◆ MtelYv KvR KivúDUvi e`envii tʻqʻt mbv³ KitZ cviteb/

KivúDUvi AvaybK Rxebhvivi cŪZuU tʻqʻt Ggbfite c`PviYv KitQ th Dbz Ges Dbqbkj t`kmgʻ th hvi mva`gZ KivúDUvii e`envi ewx Kti Ptj tQ| evsj v`k eZgʻtb v`kʻve`v, tUvj thvMvthvM, hubevnb Pj vPj, mi Kvi x kumbhš;meʻ AwaKviti KivúDUvii e`envi cʻj b Kivi cʻPov Pj tQ|

cŪKwZK meAvʻbi melqmgʻni ZÉxq aviYv Qvov Ab`vb` me aitʻbi MtelYvi tʻqʻt AZ`š Ruj cŪkwi I `vgx hšcwiZ e`eüZ nq| Gme hšcwiZ µq Kiv, `vcb Kiv Ges MtelYv KvR Pviy tQ hvl qv GKvKx tKvb GKwU t`tki cʻqʻ AmjʻavRbK etj B CERN mn Ab`vb` thš_ MtelYvvi Mto DVtQ AvRKvj | tmšfvM`ekZ v`kʻv MtelYvq Lʻy D`P gʻt`i hšcwiZ bv ntj I Ptj, v`kʻv gʻtbmeAvb, fivv v`kʻv; BZ`w` tʻqʻt Aek` cŪqvRbxq hšcwiZ ht_ó `vgx| A_`cŪBi mʻtebv qʻxY ntj I th aitʻbi MtelYv Kiv mʻe Zinj v`kʻv mʻúwKʻ melq| v`kʻv tʻqʻt Aek` AʻbKiv`b AvʻM t_ʻtKB KivúDUvii e`envi iiæntʻtQ|

v`kʻv tʻqʻt KivúDUvii e`envi tʻqʻt meʻtkʻl wZbuU c_ KfvʻM fvM Kti t`Lv DvPZ – cŪ`vgK, gva`vgK I D`P v`kʻv| Avqv`i t`tk mi Kvi x cŪ`vgK v`kʻv e`e`vq tkYxKtʻqʻ KivúDUvi e`eüZ bv ntj I cŪ`vgK v`kʻv Awa`Bi ev RvZxq v`kʻvµg I cv`cŪyK tevW`Zv`i bvbv KvR KivúDUvi e`envi Kti | gva`vgK `ʻi ŪKivúDUvi v`kʻv Ū melq w Hiv`OK melq wntmte beg tkYxi v`kʻvµtg itʻtQ| D`P v`kʻv tʻqʻt MtelK, v`kʻvK, cŪvmK, bwiZ wbaʻʻK mevB KgʻtevK KivúDUvi e`envi Kti b|

Gevi Avmv hvK&MtelYv tʻqʻt KivúDUvii e`envi mʻtŪ Avʻtj vPbvq|

Avgiv Rvb, KivúDUvii software AwZ `əZ MwZtZ meKwKZ nt`Q| A_ʻʻ GKvʻWigK tʻqʻt mg`ÍcŪ_ex Rʻto hZ tgšj K MtelYv agʻcŪkvbv tei nq Zvi tPtq AʻbK tev msL`v software tei nt`Q cŪZ eQi | Richards etj tQb KivúDUvi tKvMvs, mĀqKiY, MYbv BZ`w` KvR AwZ mnʻRB MtelKtK mrvh` KiZ cvti | Avgiv t`Le GB KvR_ tʻj v`kʻv fite ntZ cvti |

- **tKvMvs ev mstKwZK cŪµqv**

KivúDUvii mrvh` AwZ mnʻR text mstKwZK cŪµqv msi qʻY Kiv mʻe GiKg GKwU Avw` mclwI q`vii bvg “The Ethnograph”| eZgʻtb Aek` `qsmµq ev automated tKvMvs tKškj I Pvj yntʻtQ|

• **mÂqKiY** (Storing information)

«KQycPij Z mdll q'v'ii mrvth" RbMY, ~vb BZ"v" m=Üxq Z_" msiŒY Kiv m=è/ tKvlls cLqv' mvt_ m=úwKŒ Kti Z_" mÂq Kij cieZŒZ GB Z_" e'vcKfvte e'envi Kiv m=è nq|

• **MYbv Kiv** (Counting)

"Text search programe" Gi mnvqZvq

- *civ AbyÜvb* (searching text): *MtelK wbr~^cŒqvRb AbyÜvb gj Z_" AbyÜvb KvR text retrievers e'envi Kti _vtKb|*
- *thvMvthvM* (linking): *g'vKbUk KúDUvtii nıBcvi KivŒGi D"teŒbi dtj MtelK Hyper research, hyper soft, hyper quell aııbi cŒqvRbxq mdll q'vi vKtb wbtZ cvtib|*
- *vPÎ, WvqvMög I tbUI qvKŒ: ATLASTI cŒg MtelYv KvRi Rb" semantic networking e'e~v Pvj yKti |*

KúDUvi KLtbvB MtelıKi gj vPŒı kıv³ ev mRbxkıv³tK Qmoıq thZ cvıte bv| Zte hZ vı b hvı"Q ZZ evRvtı bZb m=tebvıŒ mdll q'v'ii Avıe"vtıi dtj MtelK AvıK nvtı KúDUviıK Zıı MtelYv KvRi mvt_ m=úv³ KıtZ cvııQb|

«ŒŒv MtelYv KvR KúDUvtii e'enviıK c_vK Kti t~Lv ht_ó Kóvıa" e'vcvi |



cvıVvEı gj"ıqb - 1

• **msvŒB DËı cŒæ**

1. «ŒŒv MtelYvı tŒŒı GKRb MtelK vKfvte KúDUvtii mnvqZv MŒY KıtZ cvtib?
2. MtelYv KvR KúDUvtii tKvlls, mÂqKiY I *civ AbyÜvb KvR_ııj e'vLvı Kıab|*

cW 2

MtelYv cwi KÍ buq KÍúDUvi

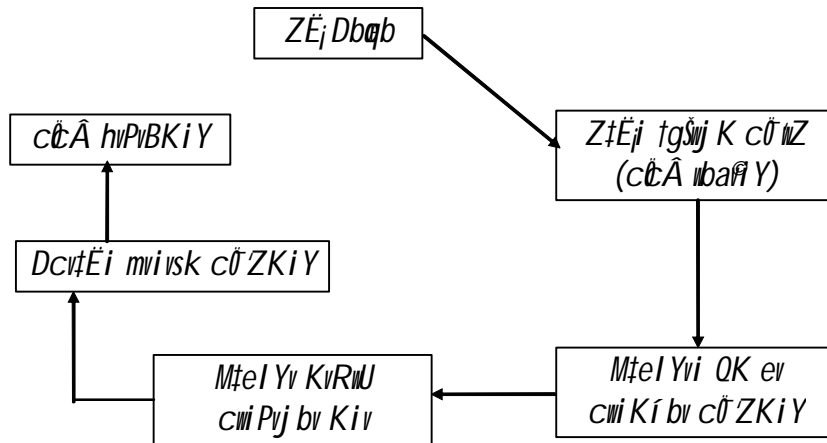
Dfík`

GB cW tk`l Avciw —

- ◆ MtelK wntmte KÍúDUvii e`envi wPwYz Kitz cvi`teb Ges
- ◆ MtelYvi wwfbae`li wbu`0 Kitz cvi`teb|

c0q GKkZ eQ`ii AwfÁZv tcmi`tq AvR w`k`qv MtelK w`k`qv MtelYv`K `eÁwmbK MtelYvi mgch`tqi ghP`vq DbwZ Kitz m`q`g ntqtQb| hw`l`i`iaZ Ae`v GiKg wQj`bv|

GB cvtVi`i`iaZB Avgiv GKwU`eÁwmbK MtelYvi QK t`tL`tbB|



wPÍ 6-2.1: `eÁwmbK MtelYvi QK

GB Q`ki tgvU Qqwu``f`ii c0ZwU`tZB eZ0v`tb KÍúDUvi e`envi Kiv m`æ`etj c0Zxqgvb ntqtQ| Avgiv GB cvtV c0ZwU``li wetePbv Kie|

Avgiv GB tKv`tmP wwfbaeBDwbtUi gva`tg tR`tbwQ, tKvb wbu`0 w`l`tq wbu`0 mgq ev cwi`tek Ablyvqx tKvb NvUwZ, mgm`v` t`Lv` t`q Ges GB mgm`v` mgvav`tbi Rb` w`k`qv MtelK (ev Ab` th tKvb MtelK) e`enwvi K (ev applied) MtelYv Kivi w`m`x`v`SÍ M0Y K`tib| Gici wZwb mgm`vi MfxiZv Ablyvqx MtelYv c0Á c0Z K`tib|

MtelYvi c0qvRbxqZv, mgm`vi MfxiZv, c0B mgq Ges c0tÁi Dci w`f`wÉ K`ti MtelK cwi KÍ bv c0`qb K`tib| eZ0v`b mg`tq KÍúDUvii tgs`ij K Ask (hardware) Ges tcm0g (software) w`tq c`w`exi DbwZ Ges AM0v`gx t`kmg`fn GZ teik msL`K KvrR`nt`Q th wwfbae`software Gi g`ta` c0qvRbxq tcm0g`wU`i gva`tg th tKvb MtelK Zvi MtelYvi wwfbae`f`i KÍúDUvii e`envi m`á`ú`3 Kitz cvt`ib|

cW 3

KwúDuvI I MtelYv Z_

Dfik

GB cW tkfI Avcb —

- ◆ MtelYv Z_ msi qY KvR KwúDuvIi e`envi mbr³ KitZ cvi`eb|

uk`qYv e`e`v th tKvb t`tki c`qRb| Av_`mvgvRK Ae`v Ges ivóq Pvn`vi Dci
 wbf` Kfi Mto I`v| Avevi uk`qYv e`e`vi wvfbw`tki DbqbKfi uk`qYv MtelYv Kiv
 nq| th`nZzKwúDuvIi mrvth` MtelYv KvR cvi`Kíbv I cvi`Pijbv Kivi mv`
 KwúDuvI µq Kiv, `vcb Kiv, Mtel`Ki wbr`^c`k`qY, c`qRbq software mSMh
 Kiv, AvSR`ZK ch`q MtelKfi i mv` thvMvthvM i`qYv Kiv me mgqB A_`I
 tUij thvMvthvM I w`j`Zi e`envi itq`Q ZvB KwúDuvIi mrvth` I KwúDuvIi Øviv
 MtelYv Kiv Avgv`i t`tk GLtbr Rbuc`Zv jvf Kfi bvB| m`z`ivs eZ`vb cvWU
 Dcj wä KitZ ntj Avgv`i ewnt D`vniY ch`j`vPbv KitZ nte|

B`UvItBU, on-line e`e`v, I`qemvBU BZ`w` m`eav`_tjv i`agv`I KwúDuvIi gva`tg
 cvl`qv m`e|

DcvE` mSL`vi AvKfi ntj mviYx Kfi ivL`Z nq| GKB ai`bi Z_` wvfbw`MtelYvq
 tcfZ ntj t`c`M`gs-Gi gva`tg wbr`^t`c`M`g`Zwi Kfi tbl`qv m`e| uk`qYv gtbw`Avb
 AvSR`ZK ch`q AZ`s`l`AMhni etj GB t`q`f`I MtelK DcvE` mSMh Kfi c`Pij`Z
 t`c`M`g`i e`envi Øviv AZ`s`l`m`f`R w`tk- IY `Zwi KitZ cvi`eb| AZ`s`l`m`vaviY
 ch`qi Z_` mSMh Kivi c`x`w`Z nj mviYx` Kfi diskette Gi store Kfi ivLv|

mSMxZ Z`_`i gva`tg M`ndKij wP` tcfZ ntj KwúDuvI M`ndK`n Astk th`Z nte;
 wvWVI M`ndK`n tKSkj e`envi Kfi `U wP`, cvB wP` BZ`w` c`Z`Z Kiv m`e| wv`v`U
 e`ZxZ AcwUK`ij wv`v` (optical disk), CD-ROM, DVD-ROM BZ`w` i mrvth`I
 Z_` msi qY Kiv nq| G m`f`U w`v`w`Z Z_` Øw`k`qYv thvMvthvM I c`h`y`Ø` tKvM`
 eBwU`Z cvl`qv hvte|

PLEXYN wktivv`gi GKw KwúDuvI wbf` tKvWv c`x`w`Z Av`Q hvi mrvqZvq
 ch`e`qY c`x`w`Z wbf` MtelYv Kiv m`e|

ch`e`qY c`x`w`Z wbf` MtelYvi Z_` KwúDuvI msi qY Kiv m`e| wvfbw`uk`qYv
 MtelK GB ai`bi KvR K`MR-Kjg c`x`w`Zi w`Kí w`tmte KwúDuvIi w`K-`tevW`Gi
 mrvqZvq Z_` tiKW`Kivi mv` mv` msi qY Kfi w`t`PQb| AwVI Ges wvWVI e`e`vi
 gva`tg th mg`I MtelYv KvRi Askw`tkl tiKvW` Kiv nq` tm`_tjvi msi qY KvRi
 KwúDuvI e`envi Kiv m`e|

ᄡ Ae GWKkb

KᄡúDUvi Ges Ab'vb" hšcwZ Ges DcKi†Yi mnvqZvq Z_ ev DcvÉ (data) msMh c×wZ AZ"š dj cñfvte Kiv mæ| AwWI, wfwWI gva'†g th mg'lmv¶vrKvi MhY Kiv nq tm,tjv†K chē¶¶YthvM" tKvW (observational code) e"envi K†i mi vmi KᄡúDUv†i msi¶¶Y Kiv nq| Gi dtj cieZ¶ w†kdY Aa'vq AZ"š mōZvte Kiv P†j | KᄡúDUv†i i mnvqZvq Ab-j vBb gwbUwi s Kiv P†j | On-line monitoring is the process of capturing characteristics of the human-computer interaction automatically, in real time, from an operating system. [†Riv†mb, 1997]

KᄡúDUv†i i gva'†g th mg'ldwI q'v†i i mnvqZvq Z_ a†i ivLv nq Zvi K†qKw D`vniY wbg†c:

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

G mg'Z_ c†i w†fbæmg†q w†fbæc†q vq vq w†kdY K†i w¶¶v†¶† e"envi Kiv nq|



c†VvÉi gj'vqb - 3

- **msw¶B DÉi c†æ**

1. M†elYv Z_ msMh I msi¶¶Y Kivi K†R wKfvte KᄡúDUvi e"envi Kiv mæ?
2. KᄡúDUv†i i mnvqZvq M†elYv Z_ msMh I msi¶¶Y Kiv nq GiKg K†qKw mcdwI q'v†i i bvg wj L†y|

vbNE

A
AcivgwiK cwi msL`vb 71

P
Pz³ 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` 33

Q
QK (eÁmbK Mtel Yv) 90

d
F-test 85

K
KvBelM⁹U÷ 73
tKvMvs c⁹uqv 88

U
t-test 80

f
tf`v¼ σ 85

M
Mtel Yv m` f⁵³
MvE 39
Mtel Yv
Kvth⁹c⁹thvMx 17
Rvi c 12
vel qx Aby`vb 14

Z
Z` ti diti wYs tKŠkj 50
msMh tKŠkj 27

h
z-test 77
uk⁹iv Mtel Yv 25

m
mstk- I 56
mstk- I v¼ 61
`faxbZivgvi 85
mv⁹ivKvi
tKŠkj 29