

# **Ինկյն Միտել Կր**

**Educational Research**

**EDM 1205**

**Գր Գր Կր Միտել**

**Կր Ար Գր Միտել**



**Երևանի Միտել Կր Կր**

# Ինքնուրույն Ինքնուրույն

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Գրքի Կրթություն

Ինքնուրույն

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Կրթության Կրթություն  
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# Ինկյն Միել Կն

EDM 1205

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ԽՆԿՆ |



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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 21<sup>st</sup> century : computer in educational research educators, educational administrators and classroom teachers. The book presents the subject matter in self instructional text material style.

Course Coordinator : Monira Hossain.

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## ᑦᐱᑦᐱ

eZgub cZthwMZvgq hM th tKvb tckvq tckvfiEK Dbqb μgvMZfvte chēᑦᑦY Kiv AZšl ,iaZcYKvR| MtelYv cūqvi gvaᑦᑦg GB mgᑦI KgRvŪi DbwZ, AMMwZ, mej `ᑦᑦ w K wPwYZ Kiv BZᑦw` KivR ,tjv nᑦq ᑦᑦK| ᐃᑦᐱᑦᐱ ᐱᑦᐱᑦᐱ ᐱᑦᐱᑦᐱ cūPxbKij ᑦᑦᑦK cūwZ nᑦj l eZgᑦᑦb Gi wewfbaw`K wbtq wētkj me ,tjv ᑦᑦᑦK B Kg teuk ᐃᑦᐱᑦᐱ ᐱᑦᐱᑦᐱ ᑦᑦᑦᑦᑦᑦ K ev cūqMgj-K MtelYv KivR Kiv nᑦᑦQ| B`vbx Kvj cūqRbxqZv Abᑦe Kᑦi ZvB ᐃᑦᐱᑦᐱ ᐃᑦᐱᑦᐱ RbwcbZv jᑦᑦᑦ mg\_ᑦnᑦᑦᑦQ| ᐃᑦᐱᑦᐱ ᐃᑦᐱᑦᐱ ᑦᑦᑦᑦᑦᑦ cūg BDwbᑦU GB ᐱᑦᐱᑦᐱ ᑦᑦᑦᑦᑦᑦ ᑦᑦᑦᑦᑦᑦ Dci mvaviY Avᑦj vPbv mshᑦ Kiv nᑦᑦQ|

cvW - 1 ᐃᑦᐱᑦᐱ ᐃᑦᐱᑦᐱ ᐱᑦᐱᑦᐱ ᐱᑦᐱᑦᐱ

cvW - 2 ᐃᑦᐱᑦᐱ ᐃᑦᐱᑦᐱ ᐱᑦᐱᑦᐱ ᐱᑦᐱᑦᐱ

cvW - 3 ᐃᑦᐱᑦᐱ ᐃᑦᐱᑦᐱ ᐱᑦᐱᑦᐱ ᐱᑦᐱᑦᐱ

**իկՊՎ ՄթելԿՎ : avi Yv I cժզՎՐԽՂԶՎ**

**Df`ik`**

GB ciV tkfI AvciB —

- ◆ իկՊՎ ՄթելԿՎի avi Yv e`3 KițZ cvițeb Ges
- ◆ cժզյ Z իկՊՎ իՊիթի ՄթելԿՎի cժզՎՐԽՂԶՎ e`vL`v KițZ cvițeb|

Avgiv G J Mouly-Gi research ev MթելԿՎ msμνślmsÁv w`tq cvVU i iæKie|

tgŕij i gțZ 00research is best conceived as the process of arriving at dependable solutions to problems through the planned and systematic collection, analysis and interpretation of data.”

A\_ŕ cwi Kiv Z, arivennKfıte Z\_` msMđiceŕ tmB Zt\_`i wețkdY Ges e`vL`vi gva`tg hLb tKvb mgm`vi wbfŕthvM` mgvaib LŕR cvl qv hvq ZLb tmB c`xwZtK MթելԿՎ ej v nq|

tgŕij Avil etj tQb 00It is a most important tool for advancing knowledge, for promoting progress and for enabling man to relate more effectively to his environment, to accomplish his purposes and to resolve his conflicts.” Ávıbi m`úthviY, DbwZ wKsev cwi tētki mıt\_ wbtRtK m`ú`3 Kiv, wbr`^Df`ik` ev`éwqZ Kiv ev wbtRi msNıtZi mgvaib LŕR tei Kivi Rb` MթելԿՎ AZ`śl\_ iæŕŕDcKiY|

MթելԿՎ cժg tK ev KLB i iæKtib ev Kiv GtK Rbıcđ Ktib G atıbi Z\_` eZŕvb cıfV msthıRb Kivi cժզՎՐԽ tbB| weÁvbx WviDBb 1859 mıtj cKwıKZ eB “Origin of Species” G cժg c`v\_`weÁvb, imvqb, RxeıwÁvb I fıMıtjı mıt\_ gıbeRvıZi m`úK`e`vL`vKıv MթելԿՎagŕ Z\_` cKıv Ktib| 1896 mıtj wWDB KZŕ.hŕıvıtóŕ wKıvıMıv wekŕe`ij tq j`veııUıı `ŕ cŕZöV KiıK իկՊՎ ՄթելԿՎի i iæetj atı wbtZ cııı |

Gici mgıqi mıt\_ wețkıı weıfbae`ıtb իկՊııe` I gıtbıwÁvbxıMY AvbŕınbK իկՊՎ e`e`vi weıfbae`ı K wbtq MթելԿՎ KıR KtııtQb| GfıteB իկՊՎ e`e`vi mıt\_ m`úKıŕŕ mgm`vi mgvaib LŕR cvl qıı j`tŕı` իկՊՎ ՄթելԿՎի RbıcđZıv I wekŕ`Zıv ARŕ KtııtQ|

Geıı Avgiv իկՊııtŕıı MթելԿՎի cժզՎՐԽՂԶՎ wbtq wKQyK\_v ejel ivó`hLb t`tkı RbMıYı Rb` cժզՎՐԽ իկՊՎ e`e`v cıı Kııbv, cŕıqb I ev`éıvıtbi `ıwqZı MđıY Ktı ZLb Gi weıfbae`ıŕıı cժqk weıfbaemgKıvıx Am`úYŕZıv wPııYZ Kivi cժզՎՐԽ t`Lv t`q| chıŕıııEK th իկՊıııg t`tkı weıkó իկՊııe`MY cŕıqb Ktıb ZıvZ weıfbae mgıq weıfbae KııY Am`úYŕZıv, Am`ıwZ aıv cıı| wK tZgııb tKııKıŕı hLb weıŕıııEK իկՊııMY իկՊıı KııLb Kııŕıg cııPıııv Ktıb ZLb Zıııı gııZ

ḡ Ae GWKkb

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

mi Kvþi i wKŋv gšYvj qþKI wKŋvbwZ cŋqb I ev'evqþbi newfbæw' K wbtq MtelYvi  
gva'tg tgšij K, KvRi, MhYþhM' wmxvš' tclwþZ nq| gj'vqb Kvþig  
cwi Pvj bvKvix ms'v (D`nvi Y: Avgvþ' i t'þki ōŋgva'wgK I D'P gva'wgK wKŋv tevWŋŋ)  
wbR'^Kvþig me j, `ŋP w'K wPwýZ Kiv I DbwZ Avbqþbi jþŋ' cŋZubqZ  
MtelYv KiþZ cvþib| Avevi Dbqbkxj t'kmgþn `vZvms'vi A\_°mvrþh' th mg'Ī  
wKŋv cKĪ PvjYKiv nq tm mg'ĪcKĪĪ I wbeŋx KgRZŋe,` wþRiv wKsev MtelK  
wbtqvþMi gva'tg cKĪi newfbæAstki gj'vqb Kvþi Rb' MtelYv Kþib|

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

wKŋvµg, wKŋY wKlb migMŋ cŋqb I e'envi, ciW'cyK Gi newfbæw' K, wKŋY-wKlb  
c×wZ, wKŋv gj'vqb BZ'w' ,iaZcy°Askmgþni Am½wZ, `ŋPZv BZ'w' w'K  
Aej æþb wKŋv MtelYv KvR cwi Pvj bv Kivi cŋqvRbxqZv AvRþKi `æZ Dbqbkxj  
wþk!Ab'xKvþ



### cvþVvĒi gj'vqb - 1

- mswŋB DEi cke
1. MtelYv mspvš'itgštj i msÁvU e'vL'v Kiab|
  2. ōŋ1986 mvþj wWDB KZR.Avtgwi Kvi hŋivtŋŋ wKvþMv wktje`ij tq j'veþiUwi  
ḡ cŋZŋv KivþK GK Aþ\_°wKŋv MtelYvi 'iaejv mæŋŋ GB K\_wUj Zvrch°  
e'vL'v Kiab|



ᄡ Ae GWKkb

Gevi Avgiv j ᄡ Kie evsj vt`tki ᄡᄡᄡᄡ e`e`vi DbᄡZKᄡr th aiᄡbi MᄡelYv Kiv  
cᄡᄡᄡRb Zvi j ᄡᄡ ᄡᄡᄡZi nᄡZ cvᄡi | cᄡᄡᄡᄡ ᄡᄡi ᄡᄡᄡᄡ e`e`vi Rb` cᄡᄡᄡRbᄡᄡ  
MᄡelYvi j ᄡᄡ ᄡᄡᄡᄡ nᄡZ cvᄡi –

- Aóg tkYx chᄡᄡ cᄡᄡᄡᄡ ᄡᄡi ᄡᄡᄡᄡ e`e`v DbᄡZKiᄡYi DcᄡᄡᄡZv  
hivPivB |
- eZᄡᄡ Av\_ᄡᄡᄡᄡᄡ e`e`vq Aᄡᄡᄡᄡᄡ mgvR KZᄡ. Aóg tkYx chᄡᄡ  
cᄡᄡᄡᄡ ᄡᄡi eva`Zivᄡᄡ-K Kivi DcᄡᄡᄡᄡZv I A%ᄡZᄡᄡᄡ ᄡᄡᄡᄡ e`e`vi  
MᄡYᄡᄡᄡZv ᄡᄡYᄡᄡ Kiv |
- cᄡᄡᄡᄡ ᄡᄡi ᄡᄡᄡᄡ ᄡᄡᄡᄡᄡᄡ RᄡᄡᄡᄡZv ᄡᄡᄡᄡᄡ Kiv |  
BZ`ᄡᄡ |

gva`ᄡᄡᄡ ᄡᄡi Rb` cᄡᄡᄡRbᄡᄡ MᄡelYvi eᄡᄡea j ᄡᄡᄡi gᄡᄡ Kᄡᄡᄡᄡ D`vniY ᄡᄡᄡᄡᄡ  
nᄡZ cvᄡi –

- gva`ᄡᄡᄡ ᄡᄡᄡᄡ Kivᄡᄡᄡ Zv hivPivB |
- tkYxKᄡᄡ ᄡᄡᄡᄡ-ᄡᄡᄡ e`envi mv\_ᄡZv ᄡᄡᄡᄡᄡ |
- ᄡᄡ`vqᄡ cᄡᄡᄡ Kᄡᄡᄡᄡᄡᄡᄡᄡᄡ mej I `ᄡᄡ ᄡᄡᄡ ᄡᄡᄡᄡ |

D`P ᄡᄡᄡᄡ ᄡᄡi GKᄡᄡ j ᄡᄡ ᄡᄡᄡᄡᄡ nᄡZ cvᄡi –

- temi Kviᄡ ᄡᄡᄡᄡ `vj q mgᄡᄡi ᄡᄡᄡᄡᄡᄡ AvᄡᄡᄡZK ᄡᄡᄡ hivPivB |

**MᄡelYvi cᄡᄡ j ᄡᄡ nj Ggb ᄡᄡᄡ bZᄡ ᄡᄡZ`i Aᄡᄡᄡᄡ GLbᄡ chᄡᄡhvi ᄡᄡᄡ cvᄡ ᄡᄡᄡ  
ᄡᄡᄡ |**

ᄡᄡᄡᄡ MᄡelYvi Kᄡᄡᄡᄡ mvaviY Dᄡᄡᄡᄡ ᄡᄡᄡᄡᄡ nᄡZ cvᄡi –

- ᄡᄡᄡᄡ NUbv ev ᄡᄡᄡᄡ ᄡᄡᄡᄡᄡᄡᄡᄡᄡ j vᄡᄡ; D`vniY - gva`ᄡᄡᄡ chᄡᄡᄡ  
ᄡᄡᄡᄡᄡᄡᄡ ᄡᄡᄡᄡᄡᄡ ᄡᄡᄡᄡᄡᄡ Aa`qᄡ Kᄡᄡᄡ Mᄡᄡ Ges knᄡᄡi ᄡᄡᄡᄡᄡᄡᄡ  
ᄡᄡᄡᄡᄡ I Aᄡᄡᄡᄡᄡᄡᄡᄡ Zᄡᄡᄡᄡᄡᄡ MᄡelYv | GB cᄡᄡᄡᄡ MᄡelYvᄡᄡ  
Avgiv Abᄡᄡᄡᄡᄡᄡ ev investigative MᄡelYv ej |
- beg tkYxᄡZ `beᄡᄡᄡᄡᄡ ᄡᄡᄡᄡ MᄡᄡYKᄡᄡᄡ ᄡᄡᄡᄡ ᄡᄡᄡᄡᄡᄡ ᄡᄡᄡᄡᄡᄡ  
ᄡᄡᄡᄡᄡᄡᄡ ᄡᄡᄡᄡᄡᄡᄡ ᄡᄡᄡᄡᄡᄡ ᄡᄡᄡᄡᄡᄡ ᄡᄡᄡᄡᄡᄡ Kᄡᄡᄡ - GB NUbᄡᄡᄡ  
evsj vt`tki kᄡᄡᄡ ᄡᄡ`vj q, ᄡᄡᄡᄡ GKᄡᄡᄡ cᄡᄡᄡᄡᄡ NUbv ev Pj | ᄡᄡᄡᄡ  
MᄡelK GB Abᄡᄡᄡᄡ ᄡᄡᄡᄡᄡᄡᄡ hivPivB KiᄡZ AvMᄡᄡ nᄡZ cvᄡiᄡ | GB aiᄡbi  
Pj Gi Kivᄡᄡᄡᄡ ᄡᄡᄡᄡᄡᄡ Abᄡᄡᄡᄡ ᄡᄡᄡᄡᄡᄡᄡ hivPivB ᄡᄡᄡᄡᄡᄡ MᄡelYvᄡᄡ ej v  
nq ᄡᄡAbᄡᄡᄡᄡ ᄡᄡᄡᄡᄡᄡᄡ hivPivBᄡᄡ ev hypothesis testing cᄡᄡᄡᄡ MᄡelYv |

- tKvb NUbv KZevi NUtQ Ges Ab` tKvb NUbv ev KviŷYi mvt\_ cŭgWU m`uKŷŷ Kbv Zv LjR tei Kiv - GB aiŷbi Mtel YvK j ŷY ubiŷK ev diagnostic Mtel Yv ej v nq|

GB cvŷV evsj v`tki Pj gvb wKŷv e`e`vi cwiŷcŷŷZ wKŷv Mtel Yvi j ŷY` I DŷiK` wK aiŷbi nŷZ cvŷi Zv wbtq AvŷjvPbv Kiv nj | cvŷVi tktI Avgiv t`ŷL tbB wKŷv Mtel Yvi DcŷhwMZv, djvdj ev outcome wK aiŷbi nŷZ cvŷi | wKŷv Mtel K wiP (Rich) Gi gŷZ wKŷv Mtel Yvi DcKiYMZ Ges fveMZ Dfq cKviŷi DcŷhwMZv \_vKŷZ cvŷi |

Ab` GKRB Mtel K dŷvbr (Fulana) etj tQb – gj-Z `B cKviŷi Mtel Yij ä djvdj wKŷvŷŷŷ e`eüZ nŷZ cvŷi | cŭg cKviŷi Mtel Yij ä Ávb tKvb GKwU mgm`vi tŷŷŷ cŷqM Kiv nq Ges cŷi Gi mgvavŷbi gva`tg cŷB Ávb cieZŷZ mavi YxKiY Kiv nq | wZxq cKviŷi cŷB Ávb nj cumulative Ávb Ges GB Ávŷbi Dci wŷŷ Kŷi c`ŷŷc w`i Kiv nq | Aek` ZZxq GKwU cKviŷf` I eZŷŷb Rbucŷŷ nŷq DVtQ | Gi gva`tg Mtel Yij ä djvdj mimmi we`ij q, tkYxKŷŷ wKsev wKŷv\_ŷ Mŷ cwiŷŷŷi Dci cŷqM Kiv nq |

wKŷv tŷŷŷi mŷ½ m`uKŷŷ weŷe` wbtq Mtel Yv weŷŷi Dbŷ t`kmgŷŷ hŷ\_ó RbucŷŷZv jvf Kiŷj I evsj v`k AvRI GBŷŷŷŷ AŷBK wcuQŷq AvtQ |

GKwU K\_v gŷb ivLŷZ nŷe, wKŷv Mtel Yv I mgvR Mtel Yv i`asvŷ AZxZ I eZŷvb e`e`vi cŷZ j ŷY` bv tiŷL fweŷŷŷi w`ŷK `wŷ wbeX Kŷi cwiPj bv KiŷZ nŷe | KviY mgm`v D`ŷŷ nŷl qvi cŷeB hŷ` Mtel Yvi gva`tg m`ŷe` mgm`v wŷŷŷ Kiv m`ŷe` nq Zŷe Zŷŷ AŷBK AcŷŷZKi cwi w`wZ Govŷbv m`ŷe` nŷe |



## cvŷVwEi gj`vqb - 2

- mŷŷŷ DEi cŷŷe
  1. wKŷv Mtel Yvi Avw` weeZŷ eYŷv Kiab |
  2. evsj v`tki cŷ\_wgK wKŷv e`e`v m`ŷŷÜ MŷxZ Mtel Yv KvŷRi m`ŷe` j ŷY` wK wK nŷZ cvŷi ?
  3. AvŷRŷZKfŷŷe `ŷKZ wKŷv Mtel Yvi avi vmgŷ eYŷv Kiab |

### ուրր ՄտելYv : evsj տ֛՛k cւի՛tԸրր

#### Dի՛k՛

GB civ տկ՛tI ArԿւb —

- ◆ evsj տ֛՛k eZԳւb mgտq uրր ՄտելYvi Ae՛ւb uրրyZ Kի՛Z civեb Ges
- ◆ AvԳԳմbK uրր e՛e՛ւq uրր ՄտելYvi cԸqւRԲիxZv eYԳv Kի՛Z civեb|

AvԳiv տRտնՈ th, uրր ՄտելYv Գյ-Z տԿv տ֛՛kի AvԳԳմbK uրր e՛e՛ւi մի՛ մա՛ւԿրԳ տԿv NUbv ev NUbրmgճni ԿւհՔviY ԼԳR թei Kivi Կւ՛R cւիPւյj Z cւիZMZ I ՛beԳՅK ev objective տիԿՊՔiY I տե՛kժ Y | տԿv ZԷյq uրր Մտել K GKB mgտh GKB ai՛tbi ՄտելYv djvdj շե՛րր Y I տե՛kժ Y Կի տԿv մvaviY Բու՛Z ev ZԷյj Avե՛ւi Kի՛Z civեb| G mg՛t ZԷյq I ժյj Z ՄտելYv Կւ՛Ri djvdj շե՛րր Y Կի Բիել՛ր uրրտե՛ I uրրտր ԿՅZvMY տԿv NUbv ev cւիւ՛ւZ մա՛ւԿՅ Բիել՛ՅvԲ c՛Z Kի՛Z civեb|

Geriv AvԳտ֛՛i տԳRi տ֛՛kի տ֛՛k ՛ւօ՛ տdivB|

AvԳiv Rւոb evsj տ֛՛kի AvԳԳմbK uրր e՛e՛ււ ZԲu՛ւ cճv՛b ՛ի cւիPւյj Z nq - cՈւԳK, Գvա՛ւԳK I D՛P uրր ՛li | G հverԿuj uրր cՈZՅտԳ th mg՛t Մտել Yv Կւ՛R նտճՈ Zvi տե՛kի ԲvM cւիPւյj Z նտճՈ D՛P uրր ՛ի ev տե՛kի ՛յj զմԳճn| Գյ- civ՛ տելq տԳ՛P GB ՛ի i ՄտելYvi տեիY eZԳւb civ՛V Dc՛ւcճbi տԿv cԸqւRԲ տԳ| AvԳiv Գյ-Z Օժուրր Abյ՛Օժ Ges cՈւԳK I Գvա՛ւԳK uրր ՛ի i տե՛ւԲԲա՛ւ K տԳ th mg՛t Մտել Yv Կւ՛R evsj տ֛՛k նտճՈ ev ոI զv DւPZ Zvi cՈZ AvԳտ֛՛i ՛ւօ՛ տ֛՛Z Pււ՛Ո|

AvԳiv cՈւԳ տ֛՛tL տԳ ՛ճաԲZv jտ֛՛fi ci evsj տ֛՛k Lմov uրրտր c՛րԳ ԿւԳւՄԳճ Օժուրր ՄտելYvժ մա՛ւԿՅԿ ai՛tbi մԳւուկ տի՛tԼտճ| [cՈւԳ տի՛tու՛t՛Կ cԸqւRԲիx Ask Zճյ aiv nj GB civ՛V| Օժevsj տ֛՛kի uրրտժ տԿմԵB G G մա՛tՄ տե՛ւու Z Avճյ vPԲv iճտճՈ| ]

RvZիx uրր ԿւԳԿb KZR.cԿուԿZ տի՛tու՛PՅ cՈւԳK uրր Astk Dյj Լ iճտճՈ —

ՕժcՈւԳK uրր մսմւ՛ճի հveZիx տելq մա՛ւԿՅZ՛ մսմ՛, Avյւ՛ւb I Մտել Yv Կւ՛հ՛P RԲ՛ Ges տ֛՛ke՛ւcԲ cՈւԳK uրր cճրտճԿ մյԳւ՛ՅZ Kievi Dի՛t՛k՛ GKւՄ cՈւԳK uրր GKւ՛WԳ I GKւՄ RvZիx cՈւԳK uրր տե՛ւ՛ւcԲ Kiv ՛i Kiv |Օժ

cieZԻZ ԳԳԳւմսճn NAPE ev National Academy for Primary Education cՈZու՛Z նտճՈ Ges տե՛ւԲԲա՛ւԳ G cՈZՅտԳ cՈւԳK uրր e՛e՛ւi տե՛ւԲԲա՛ւ K տԳ Մտել Yv Կի Pյj ճՈ|

ուրր-ուրր Y Aa՛տճ Dյj Լ iճտճՈ —  
Gg GW տԸՄԳ

00 . . . Avgv`i t`tkl AbwZiej t^GKwU RvZxq uk`qv MtelYv KvDwYj `vcb KitZ nte|00

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

00MtelYvi wevfbækvLv, h\_v cixqv I gj`vqb cxwZ, uk`qvi wevfbæ`ti AcPq, uk`qv-A\_0wZ, QvI AmtšI, `q wev s, uk`qv cwi Kíbv, kvixwi K I gvbrmK e`waM0t`i uk`qv, uk`qvZ Rbmáú` Rixc, cvWµg, wbt`Rbv I civgk`vb, cvW`cyK uk`qv DcKiY BZ`w`i AM0waKvi wfvE`tZ MtelYv KvR MtelKtK DrmwvZ KitZ nte|00

00uk`qv c0Z0vbmgtñ G`Kkb wimvP`ev c0qvMgJx MtelYvi Dci we`kl , iæZj Avt`ivc Kiv Ges MtelYvi djvdj tK cI-cwI Kv, tckwMZ mfv, Avtj vPbv BZ`w`i gva`tg h\_vh\_fv`te c0vi Kiv c0qvRb|00

cieZPmeKqU wivt`vUB c0q GKB aitbi mzwv k itqtQ|

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

t`tki th KqU miKvix uk`qK-c0k`qY gnve`ij q Gg GW t0M0g cwi Pvj bv Kti tm,tjvtZ MtelYv`tji uk`qv`e,` c0Z`tKB GKwU we`kl w`K AeJ`tb uk`Qy MtelYvagP KvR m0ubæKti dissertation AvKv`i djvdj I mzwv k c0Z Ktib| RvZxq c0Bgvix uk`qv GKv`Wgx, XvKv wekte`ij tqi uk`qv MtelYv Bwv`wUDU BZ`w`i c0Z0v`bI uk`QyMtelYv KvR Kiv nq| Drmwv uk`qv-MtelKe,` wvR`^Df`v`MI uk`Qy MtelYv KvR cwi Pvj bv Ktib|

Dbz I Ab`vb` Dbæbkxj t`kmg`ni mvt\_ Avgv`i t`tk cwi Pwv Z 00uk`qv MtelYv00 Kv`Ri gj- cv`R` nj abstract mSM0nceR gyY Kti Avgv`i MtelYv Kv`Ri tKvb `vqx tiKW`ivLv n`Q bv, tKvb KvRwU tKvb c0k`wzi Zv wba`fY Kiv n`Qbv, c0vi Kiv n`Q bv| tgšwv K MtelYv Kv`Ri djvdj uk`qv e`e`vi tgšwv K Dbætb , iæZcY` Ae`vb ivL`tZ cvti w`K tZgwb c0qvMgj-K th mg`l wev`QbæKvR n`Q tm,tjvi mzwv k cieZPZ GKB aitbi c0Z0v`bI uk`qv e`e`vi DbæbKt`i ev`éraqb Kivi e`e`v M0Y Kijt` t`kxq uk`qv e`e`v DbzZi nte; mzwv Gw`tK Avgv`i mevi `w0 t`I qv DvPZ|



### cv`VvEi gj`vqb- 3

• msw`fB DÈi c0æ

1. RvZxq uk`qv Kwgkb wivt`vU`c0\_wgK uk`qv m0Uxq w`K aitbi MtelYv c0Z0vi mzwv k wQj ?
2. RvZxq uk`qv Kwgkb wivt`vU`c0\_wgK uk`qv tKvb tKvb w`K m0tU MtelYv Kivi c`q gZ c0v`k Kti?



**figKv**

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

Zte MtelYvi mgqKvj, A\_ cŕŕB I tjvKej Ges mteŕcwi DťĪťk<sup>2</sup>i cŕZ jŕŕ<sup>2</sup> tiťL  
MtelKMY weŕfbæcKvi cŕŕij Z cŕxŕzi ga<sup>2</sup> nťZ Dchŕ<sup>3</sup> cŕxŕzŕU teťQ tbb| GB  
BDubťU ukŕŕv MtelYvi cŕŕij Z I Rbŕcŕ KťqKŕU cŕxŕZ ŕbťq Avťj vPbv \_vKťQ|

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

**cW 1**

**uk`qv MtelYvi cKvitf`**

**Dfi`k`**

GB cW tk`l Avcb —

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

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

tg`sj K MtelYv c`vbZ tKvb Z`xq avi Yv D`m`te`bi j`q`" cwi Pvj bv Kiv nq| G ai`bi MtelYvi gva`tg Z`E; D`m`te`b, c`hvi I we`iz. NUv`bv m`e| tg`sj K MtelYv AZ`sl`m`g` Ges m`b`q`u`sz` fivte tKvb bZb mZ` D` m`v`u`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 tg`sj K MtelYvi t`pq e`enwi K MtelYvB tevk cPvj Z|

e`enwi K uk`qv MtelYv tm mg`l issue ev aviYv 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`ti t`pq bZb fivte ci`m`q`z tKSkj tevk Dc`thv`m`x n`z c`ti etj gZ cKvk Kiv nq| tg`sj K MtelYvi gva`tg c`b bZb Z`E; ev cwi evZ` Z`E; c`q`v`mi gva`tg| d`ij Z ev e`enwi K MtelYv cwi Pvj bv Kiv nq|

c`K`u`ZK we`Avb, `Re we`Avb, c`h`v`b, c`K`Skj me`q`ti`B Z`xq fivavivi c`q`v`m, c`h`y, cwi eZ` BZ`v` i j`q`" e`enwi K MtelYv mgk Rbucq`Zv j`vf KitQ| Dbz`nek; tg`sj K Ges e`enwi K `B cKv`ti MtelYvB cwi Pvj bv Kti `v`K| uk`S` Db`q`bk`xj we`tki t`kmg`- gj-Z vbr`^ mgm`v`fuEK e`enwi K MtelYv cwi Pvj bv Kivi c`z S`k`q| c`z`K Db`q`bk`xj t`k Zvi vbr`^ Av` fivgv`RK Ae`vi Dci vbf` Kti uk`qv e`e`vi vewf`b`v` K Db`q`bk`ti Ri`z`x vfu`E`z vewf`b`e` enwi K uk`qv MtelYv cwi Pvj bvi Dci tRvi v`t`q|

Avgiv uk`qv MtelYvtK Av`tiv GK ai`bi `v`tkvY t`\_tk vewf`b`e`v`t`m fivM KitZ cwi |

- HwZnvmK (historical)
- Dbqbag® (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 teiwifvM 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'úwZKKvťj t`Lv tMťQ wKŋv Mtel KMY wKfivte KivRwU Kiťeb Zv wbtq teiw mgq bó bv Kti eis KvR m'úbæKti Kvhr'i dj LjR tcťZ AvMŋx|

Avgiv GB cvťV wKŋv Mtel Yvi cKviť` m'úŮ 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`tj 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 f`ig Rnic avi Yv `g`Uv wgvj`q t`L`Z AF`-`| Dbz` I Dbqbkj we`k; B`vbx uk`Iv`t`I Mtel Yv tek Rbnc`Zv AR` 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 μgewaZ cwi`g`R` 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`U AZ`š` i`az`c`Y`

Avgiv Gevi t`wL Rnic Mtel Yv Kv`R uk`f`v`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`f`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`f`Y Ki`Z nq| Gici c`k`g`j vi gra`tg Mtel Yvi Dcv`E msl`M Ki`Z Pv`B`j AZ`š` i`az`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 t`m`B`me gv`V Kg`i` i` ubePb KvR m`u`be Kti c`q`R`bxq c`k`I`Y w`t`Z nq| gv`V ch`q KvR i`i`æ`nt`j tK``ie` t`Z th Mtel K` j Ae`vb Ktib Zv`i KvR nj gv`V Kg`i` i` KvR AZ`š` m`y`f`v`te AweiZ c`q`M`q ch`e`I`Y Kiv| gv`V ch`q`i KvR tkl Kti Kg`j w`d`ti Avmt`j raw data ev c`q`M`K`f`v`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 uk` ai`t`bi mZK`Zv Aej`b Ki`Z nq Zv t` Le Gevi |

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

- gvbepK kġai e`envi Gwotq Pj v|
- 00GKB iKg00, 00AvtMi gZ00 RvZxq DEi AvmtZ cvti G aitbi cġe wRġAm bv Kiv|
- civgk<sup>ev</sup> Dcġ kgj-K cġkwRġAm bv Kiv|
- DEi `vZvi ġZ kw<sup>3</sup>i cġqvRb nġe Ggb cġkġe msthvRb bv Kiv|

gtb ivLġZ nġe cġkġhb tQvU, mnRġeva` Ges gZ<sup>9</sup>nq| MġelYv KvġRi Rb` cġqvRbxq A\_@ivġ \_vKġj cġZwU cġkġe Rb` GKwU Kġi 00DEġii cO>`00 ev choice of answer Kiv<sup>©</sup>Zwi Kiv DvPZ| Kvi Y mv<sup>9</sup>vrKvi MġYKvix GKvKx cġkġDġvcb Kiv Ges m<sup>ae</sup>` DEi ġjv cġo tkvbġbv `BvU KvR Kġi tMġj DEi cġvbKvix wei<sup>3</sup>teva KiġZ cvġib| Kiv<sup>©</sup>ZKiv m<sup>ae</sup> nġj KvġW<sup>P</sup> tġ Lv, ġjv thb `u0 nq tmw ġK tLqj ivLġZ nġe|

j 9` ivLġZ nġe thb DEi `vZv cġkwġi A\_9WKgZ eSġZ cvġib| 00cġkġhvPvBKiv ev question testing00 cġqv<sup>ev</sup> e`envi Kġi G m<sup>ae</sup>tU wbm0Z nLqv m<sup>ae</sup>| GB cġqvq cġkġe cġqvKvix wġRB me, ġjv cġkġe DEi wġtL tbb| Gici wZvb GKRB m<sup>ae</sup>` DEi `vZvi mġ\_ Avj vġci gva`ġg tKvb cġkġe tKvb `9<sup>P</sup>Zv AvġQ wKbv Zv mbv<sup>3</sup> Kivi tP0v Kġib| Gi Rb` cġqvRbġeva wZvb m<sup>ae</sup>` DEi `vZvġK cwi kġgKI w ġq \_vġKb| GB Avj vcPwi Zv AwWI, tUġġi Kiv<sup>©</sup> Gi gva`ġg ti Kiv<sup>©</sup> nq| GB cġqvq GKRB DEi `vZvġK mġe<sup>P</sup> wZbvU cġkġe DEġii mZ`Zv hvPvB KiġZ ej v nq|

Gevi Avgiv GKwU t`kxq Ges GKwU wġt`kx Rwi c MġelYvi D`vniY t`tL cvwU tkI Kie|

**D`vniY 1**

m<sup>ae</sup>0Z (1999 mġj) CFSD (Centre For Sustainable Development) Gi AvI Zvq GKwU wġkġe`ij ġqi `9Rb wK<sup>9</sup>JK ev<sup>©</sup>Mġv b`xi ġiaZ; m<sup>ae</sup>0tK<sup>©</sup>GKwU Rwi c MġelYv Kġiġ0b| XvKv knġii wġfbġġckvRwġt`i ga` t\_ġK Giv tgvU 838 Rġbi mv<sup>9</sup>vrKvi MġY Kġiġ0b| DEi `vZvġ`i gġa` 94.5 kZvsk eġjġ0b tUgm&b`x thgb j Ēġbi Rb` cwiPq enb Kġi, bxj b` thgb Kvġġivi cwiPq cġvb Kġi wK ev<sup>©</sup>Mġv I XvKv knġii HwZn` mgv\_9, BZ`w | [Drm: 17 Aġveġ 099 Gi The Daily Star]

**D`vniY 2**

Avġgwi Kvi hġivġ0f Scarborough Research Unit of New York 1998 mġj i tdeġvni nġZ GK ermi aġi hġivġ0f 64wU gġ` evRvi ev market G 170,000 Rb cġB eq`ġK cġkġKġi GKwU Rwi c MġelYv m<sup>ae</sup>0bġKġiġ0b| MġelYvi j 9` wQj cġvb kni ġjvġZ BvUvġbU e`envi Kvixġ`i ġiaZ<sup>Y</sup>msL`v tei Kiv| t`Lv tMj, ivRavbxi 60 kZvsk tġvK BvUvġbU e`envi KiġQ| Gici iġġQ chġqvġg mġvbw<sup>Y</sup>mġKv, Av`b, wmqvUj Ges tġ K wmwU | [Drm: 18 Aġveġ 099 Gi The Daily Star]



**cvġVĒi gġ`vqb - 2**

- msv<sup>9</sup>JB DEi cġkġe
  1. wK<sup>9</sup>vġj-K KvġR Rwi c MġelYv cxwZ e`envi Kivi cġqvRġb cġqvġv cġZ Kivi mgq tKvb w ġK j 9` ivLġZ nq?

**ciV 3**

**nelqx Abgyvb**

**Dfi`k**

GB ciV tkfi Avciub —

- ◆ nelqx Abgyvb MteliYv cxiWi cKvif` Kitz cvi`teb;
- ◆ nelqx Abgyvb MteliYv cxiWi gj- tKskj mbv³ Kitz cvi`teb;
- ◆ nelqx Abgyvb cxiWi e`vL`v Kitz cvi`teb Ges
- ◆ nelqx Abgyvb cxiWi e`envi Kti MteliYv Kivi gZ nelq ukvvtvfi` mbv³ Kiteb|

Avgiv GB tkvmp` cug BDubtu ukvvtvfi` MteliYv mxfu` th AvtjvPbvi` iiaet` tluQ Zvi gva`tg ejv Ptj ukvvtvfi` MteliYv tvti` t` puW gj- avivq KivR Ptj | culguW gj-Z` e`AmbK MteliYvi aviv AbgyviY Kti GLvtb MteliK GKwU ZExq avivvi Avme`vi Ktib thWU cieZ`Z` cirvvtiYi gva`tg cZwZ` nq| wozxq avivq gj-Z` chfe`vY cxiWi clavb`` craq| MteliK GLvtb GKwU gvT` BDubU ev GKK ubtq MteliYv Kitz B`Qv` cKvk Ktib| wZwb tkvb ukvvtvfi` clZv`tbi GKrb wPvyZ` ukvvtvfi`, GKwU me`kl tkYv, GKwU me`kl ukvvtvfi` clZv`b ev GKwU me`kl tMoxi` e`mkö` j` v` Ktib, kvh`cxiWi chfe`vY Ktib, mej -` g` w` K` w` PvyZ` Ktib; BZ`w` | Ges cieZ`Z` wZwb GB djvdtj` i Dci wfvE` Kti ukvvtvfi` cxiWi, tKskj Dbz` Kivi clvm` cvb|

GB wozxq avivtk` ejv nq Case Study ev nelqx Abgyvb| GB cKwzi` MteliYvi gj- j` v` nj` Nubvi AZ` s` Mfxti` c`ek Kti Zx²` me`kl`tiYi gva`tg GKwU me`kl GKtki` wfvb`w` K mxfu` GKwU e`-ag` w` w` tcvu`cU`Z` Kiv| GB w` tcvu`P` Dci wfvE` Kti cieZ`Z` GKB aitbi` BDubU ev GKK mxfu` m`vavi Yxki`y` tcvw`b m`e`|

**cKvif`**

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

Stenhouse tkM ÷wW cxiWi gta` PviwU ÷vj` mbv³ Kti`tb| G` tjv ntf`Q —

- Ethnographic—Gtvti` GKwU gvT` nelqe`i Mfxti` KivR nq| AskMhvYKvix`K chfe`vY Ges gylvy` m`vvtvfi` i gva`tg KivRwU m`ub`Kiv nq|
- Action Research - nelqx MteliYv— Gtvti` GKwU nelq mxfu` cwieZ` Avbvi Dfi`tk` KivR Kiv nq|
- Evaluative Case Study – Gtvti` tkvb` c`vj` Z` ukvvtvfi` e`e`vi` tkvb` me`kl` w` K` gj`vq`tbi Dfi`tk` GB w` K` mxfu` Z` AvniY` Kiv nq|

**gj tKŠkj**

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

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

- cĉĀwU m²fŪ GKwU Lmov msĀv `Zix Kiv nq;
- GKwU Kiv wK (hypothetical) e'vL'v cŪZ KiŋZ nq;
- MpxZ cĉĀi AvtjvtK GKwU welq wbtq KivR iiaKiv nq I GB KivRi  
gva'tg hivB Kiv nq th MpxZ cĉĀwU GB tŋtĀ mZ'' NUbvi mvt\_ Lvc  
Lv'Q wK bv;
- cĉĀ Lvc Lv'Q bv G iKg Ae'v t'Lv tMtj cĉĀ Ges Kiv wK e'vL'v `wji  
GKwUŋK cŋMŋb Kiv nq hvZ Kti cixŋŋZ welq wU ewŋZ nq;
- cĉĀ MhY, welq cixŋŋY, cĉĀ cŋMŋb KivRwU Pj ŋZ \_vtK hZŋŋY chŠ'GB  
`wji gta'' GKwU meŋvj `ŋKZ.m²úK'vcb Kiv m²e nq|

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

- AZ''š'ev'ēZvi mvt\_ cŋwK aviYv t\_ŋK Kivŋi bKkv cŪZ Kiv;
- MtelK wntmte wK aitbi GKvŋwK ŋwZ nevi m²ebv AvtQ Zv chēēŋY  
Kiv;
- tKvb aitbi eRŋthwM'' wPš'í fievb djvdtji mvt\_ m²ú,³ ntZ cvti tm  
m²fŪ m²PZb \_vKv;
- MtelYv KivRwU Rb'' Dchŋ' vb LŋR tei Kiv;
- thwM'Zi Z\_'' cŋvbKivŋK LŋR tei Kiv;
- chēēŋtYi mvgwRK cwiŋtek m²fŪ m²PZb \_vKv;
- Z\_'', cŋvY BZ''w' wKfite tiKW'Kiv nte tm m²fŪ m²úó cwi Kíbv `Zwi  
Kiv;
- Z\_'' tkYxe×KiY m²fŪ 'úó wvŋš' MhY Kiv;
- aviYv ntZ Kiv'm²úv`b chŠ'í tKvb ga'eZŋ chŋq KZUKzmgq j wMte Zv  
wbaŋY Kiv;
- wŋcvŋ tKvb cwiw'wZŋZ tKvb aitbi `kŋKi mvgtb cKvk Kiv nte Zv  
wbaŋY Kiv|

**welqx Abg'vbi gva'tg GKRB MtelK GKwU gj-ZĒ; `vcb KiŋZ cvtib|**

**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 cwi eWZ  
ifc c0vb Kiv nq|

welqx Abgy'itbi gva'ig tKiv wekl tkYxi tKiv Aeva` wKv\_# AvPiY chfe'Y  
Kiv, wekl wKv'Ki tkYK' chfe'Y Kiv, tKiv wcuQtq cov wekl wKv\_# tKiv  
wekl welq Abgy'itbi AvMh wbyq 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'
- gvV ch'qi KivRi wekl Y wictvU'AvKivti wj wceX KiZ nte|
- Abgy'ib Ges cgyYgj-K KivRi ga`Kiv m'úK'wbyq KiZ nte|
- c0'wgK Ges gva'wgK Zt`i gta` cv`R` wbyq KiZ nte mif\_ mif\_ eY'v I  
e'vL'vi gta`I cv`R` Ztj aitZ nte|
- cKZ.KivRi weiy Wtqi xi gva'ig msi'Y KiZ nte|
- Zt`i DrKI'v thb wqšy Kiv mae nq tmw`tK tLqj i'vL'v nte|



**cv'Ve'i gj'iqb- 3**

- msM'jB DE'i ckae
  1. welqx Abgy'ib cxiZi cKvif` wj L'j|
  2. AskMhYgj-K chfe'Y cxiZtZ GKRB wKv' MtelK wK c0'vqv KivR  
Ktib?
  3. welqx Abgy'ib cxiZ Aej ab Kti MtelYv KivR Kivi mgq GKRB MtelK  
tKiv w`K, tjvi c0Z j'Y' i'vL'teb?
  4. welqx Abgy'ib gva'ig MtelYv KivR cwi Pj'v Kivi mgq MtelK wK aitbi  
mvearbZv Aej ab Kiteb?



### **Kvthc̣thvMx Mtel Yv**

#### **Dḡik**

GB cW tḳl Avc̣b —

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

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

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

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

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

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

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

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

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

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

**“eikó”**

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

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

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

**Kvthrc̥thvMx MtelYv I eʻenwi K MtelYvi gtaʻ ʻvj I cvᚲ Rʻ tKvᚲq?**

- DfqB ʻeÁmbK MtelYvi aviv AbmiY Kti |
- eʻenwi K MtelYv ZĒmgn̥ cixŋlv Kti Ges mʻúKᚲᚲᚲᚲ Kti etj Gi kZmgn̥ tek Kivb cKwZi mʻzi vs eʻenwi K MtelYvi tŋtĀ Awak msLʻK tKm ev tǵšvj K Dcvᚲ vb chŋeŋY Kiv nq |
- Kvthrc̥thvMx MtelYv ʻeÁmbK MtelYv cᚲwZi aviv AbmiY Kti | AZʻšʻ bgbxq gvĀvq Zv eʻenwi Kti | KviY Gi gj- DʻĪkʻ nj GKwU wtkl cwiwᚲZtZ GKwU gvĀ wtkl mgmʻvi mgvaib LjR tei Kiv | eʻenwi K MtelYvq th mgʻĪkZʻtǵtb Pjv nq Zvi Awakvsk wkwj Kti cǵqvM Kiv nq Kvthrc̥thvMx MtelYvi tŋtĀ |

**DʻĪkʻ**

**wʻvj q Ges tkYxKŋ mʻúKZ Kvthrc̥thvMx MtelYv maviYZ vbtʻ DʻĪkʻ mǵtʻni wfvĒtZ cwiPvj Z nq –**

- tKvb wtkl cwiwᚲZtZ mbrʻKZ.tKvb mgmʻvi mgvaib LjR tei Kiv;
- PvkxiZ wŋŋKtʻi tKvb bZb ʻŋZv I cᚲwZ mʻtŪ aviYv ARᚲ Kivi tŋtĀ;
- tKvb Pj gvb eʻeᚲvq tKvb AvavbK ev bZb tKvb Awak msthvRb Kivi cǵqvRbxqZv tʻLv wʻtj ;
- tkYxKŋ wŋŋK Ges GKvʻWwŋK MtelʻKi gtaʻ mʻúKᚲᚲᚲᚲbi cǵqvRb tʻLv wʻtj GB cᚲwZtZ MtelYv Kiv hvq;
- tkYxKŋ mʻúxq tKvb mgmʻv mgvaibgj-K aviYv ev ZĒj wKvʻki cǵqvRbxqZv tʻLv wʻtj |

**tK ev Kiv MtelYv Kiʻeb?**

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

**Kvthrc̥thvMx MtelYv cāvbZ chŋeŋY Ges AvPiY ev ʻfvemZ Dcvᚲ eʻenwi Kti |**

tKvb GKwU MtelYv KivR hLb Kvthrc̥thvMx cᚲwZtZ cwiPvj bv Kiv nq ZLb Zʻ msMᚲ Kiv Ges mvŋwMk wfvĒtZ Zv eʻenwi Kiv nq, Zʻ aviY Kiv nq; gj-ʻvqb Kiv nq | wvʻᚲ mgqmŋvi gtaʻ Gi AMwZ mʻtŪ Avtj vPbv Kiv nq cǵqvRbteʻta AMwZ ZjwšZ Kivi Rbʻ bZb aiʻbi tKškj msthvRb Kiv nq |

**mŋveᚲZv**

Kvthrc̥thvMx MtelYvi bgbxq ʻewktōʻi Rbʻ AʻbK MtelK GʻK tKvb tǵšvj K MtelYv cᚲwZ etj ʻŋKvi KtZ Piv bv |

**c0qvMi tŕŕŕmgn**

wbŕge<sup>3</sup> tŕŕŕmgŕn KvŕhŕcŕhvMx MŕelYv c×wZi gva`tg wkŕŕv m=Üŕq weŕŕqi MŕelYv Kiv nq –

- wkŕŕY c×wZ – A\_ŕ c<sup>2</sup>vMZ c×wZi cwieŕZŕhv tKvb wkŕŕK tKvb GK Awfbe c×wZ e`envi KiŕZ Pvb|
- wkLb tKŒkj – thgb GKK weŕŕqvŕŕEK wkLb Ges mŕgvMŒK cvV`mŕP Aeŕ ŕŕb wkLb Gi gŕa` tKvbŭ DEg Zv tei Kiv|
- gj`vqb tKŒkj – tKvb wkŕŕK hv Zvi MvŭbK gj`vqb Dbŕ KiŕZ Pvb Zŕe ZvŕK GB MŕelYv c×wZ wbfŕ nŕZ nŕe|

**MŕelYv cwiPvj bvi c`ŕŕcmgn wbgŕc –**

mgn`v mbv<sup>3</sup>KiY, MŕelYv Kivi KvŕR AvMŕx e`v<sup>3</sup> ev `jmgŕni ga`Kvi c0wŕK Avŕj vPbv, ZZŕq chŕŕq c0qvRbŕŕŕa c0vkZ GKB aiŕbi MŕelYv KvR chŕŕj vPbv Kiv, PZZ`chŕŕq c0vkZ KvŕRi Avŕj vŕK c0qvRbŕŕŕa cŕŕŕ<sup>3</sup> mgn`v bZb AvwŕŕK Zŕj aiv Gi cŕi chŕŕq MŕelYv tKŒkj wbaŕŕY Kiv nq Gi gŕa` iŕŕŕQ bgŕvqb I MŕelYv cwiPvj bv e`v A\_ŕUv, m`mŕ`i c0kŕŕY c0vb, Gi cieZŕchŕŕq gj`vqb Kjv tKŒkj w`i Kiv nq| mŕŕg chŕŕq c0R± Kvŕŕi Kiv nq|

meŕkŕi c0B Z\_` ev DcvE weŕkŕY Kiv nq, wvŕŕŕŕMŕY Kiv nq, Ges GKB mvŕ\_ MŕelYv c0R±ŭi mŕWK gj`vqb Kiv nq| GB mgŕq t`Lv nq wk aiŕbi fŕ ŕvŕŕŕ nŕŕqŕj, wk aiŕbi mgn`vi D`ŕe nŕŕqŕj |

KvŕhŕcŕhvMx MŕelYv c×wZ BDŕivc I Avŕŕwi Kvi wkŕŕvqZbmgŕn hŕ\_ó RbŕcŕZv ARŒ KŕiŕQ| eisj v`ŕk weŕŕŕe wkŕŕv Kŕgkb wiŕŕŕU we`vjŕŕi wkŕŕKŕ`i KvŕhŕcŕhvMx MŕelYv Kivi mgwŕk \_vKŕj I GB aviYv ev`ŕŕŕŕŕŕ tgvŕUB RbŕcŕZv jvŕ Kŕi bvB|



**cŕŕVvEi gj`vqb - 4**

- mŕŕŕŕB DEi cŕŕe
  1. KvŕhŕcŕhvMx MŕelYvi gŕa` wk aiŕbi `enkó` \_vKv DŕPZ?
  2. wkŕŕv e`v`vi mŕ½ mŕŕŕŕŕ tKvb tŕŕŕŕ wk aiŕbi KvŕhŕcŕhvMx MŕelYv nŕZ cŕŕi?
  3. we`vj q Ges tkYkŕŕ mŕŕŕŕŕ KvŕhŕcŕhvMx MŕelYvi Dŕŕ`k` wk wk nŕZ cŕŕi?

**fıgKv**

ıKıYv e"vi uerfbæı tKi mgm"v mgvatıbi jıtıY" ıKıYv MıelYvi hvıv i iæAvR t\_ıK  
cđq GKk eQi AvıM| Aek" AvRI AıtıKB mıt"n Kıib th 00ıKıYv MıelYv00  
mız"Kvi Aıt\_ eÁvıbK MıelYvi chıgıY ntZ cıti ıKbr| eÁvıbK MıelYvi gZ  
ıvgı, RıUj DcKiY I hŞıvıZi cđqıRb ıKıYv MıelYv tıYıtı nq bı, Zeyc0Z"K ıKıYv  
MıelKıK cđqıRbıq ıKıYv DcKiY ıbR" Pıvı"v Abıııqı c0Z Kıi e"envi KıtZ nq|

eZıııı BDıbıtU ıKıYv MıelYvi KıtKıU e"envi tıvıM" DcKiY ıbıtq Avıtj vPıv\_ıKıtQ|

cW - 1 ıKıYv MıelYv : avcmıgı

cW - 2 ıKıYv MıelYvi tKŞkj

cW - 3 Z\_ msMđ tKŞkj I DcKiY : cđqıM I mııııııııZı

cW - 4 mııııııııı tKŞkj

cW - 5 cıgııııı : c0Z cıııııııııı e"envi

**cW 1**

**ukŋv MtelYv : avcmgn**

**Dfi`k**

GB cW tkfi AvciB —

- ◆ ukŋv MtelYvi avcmgn mbv<sup>3</sup> KiZ cvi`teb;
- ◆ ukŋv MtelYvi Askmgfni , iaZcY`vb `Lj KiZ cvi`teb Ges
- ◆ ukŋv i`fi mi`\_ m`uukZ MtelYvi m`e` mgm`vgj-K ev`e D`vniY Dc`vcb KiZ cvi`teb|

cŭg BDib#U Avgiv f`LwQ th, AvabK RMtZ ukŋvi weifbaew K mspvš MtelYv  
 µgk AZ`š , iaZcY`vb `Lj Kfi`Q| GKB BDib#Ui weifbaecv#V Avgiv ukŋv  
 MtelYvi j`fi, Dfi`k I cKvif`` ibtqI Avtj vPbv tctqWQ|

eZ@vb BDib#Ui cŭg cv#V Avgiv ukŋv MtelYvi weifbaeAsk ibtq msv`fB Avtj vPbv  
 Kie|

Ab`vb` th tKvb cKwzi MtelYvi b`vq ukŋv MtelYvi c`wZ ,tjvi gfa`` ibtge<sup>3</sup>  
 Ask ,tjv mshŷ \_v#K:

- mgm`v vPvZKiY
- mgm`vi msAv cŭvb
- Mtel#Ki ceeZP AvfAZvi vfiEtZ mgm`v m`uukZ GKwU KvhRi  
 (AbvgZ) w`vš MhY
- MtelYvi Rb` cŭqvRbxq tools ev nmwZqvi ev DcKiY mbv<sup>3</sup>KiY
- DcKiY tools ev nmwZqvi cŭZKiY I Gi miv`th` cŭqvRbxq I  
 vbfP#hvM` Z`\_ msmh Kiv
- msMpxZ Z`\_ web`vm I tkYexKiY
- AbvgZ w`vš vfiEtZ Z`\_ wekdYKiY|

Gicfi c`f`c ,tjv AZ`š , iaZcY`

Z`\_ wekdY Kiv tkl ntq tMj AvbgwmbK th w`vš MhY Kiv ntqWj tmwU  
 thš<sup>3</sup>KZv hvPvB KiZ nte| hvPvB cteP ci Gi MhYthvM`Zv f`Lv w`tj w`vš MhY  
 MpxZ nte| Ab`vq GwU#K G#Kevti eR# KiZ nte uksev f`L#Z nte mstkvab Kiv  
 m`e ukbv| w`vš mstkvab Kiv m`e ntj bZbfvte w`vš MhY vj L#Z nte Ges Zvi  
 vfiEtZ Avevi Z`\_ msmh chf`q wdti th#Z nte| A`\_# bZbfvte cixŋYwU i`iaKiZ  
 nte|

ġ Ae GWKKb

MtelYv KtR th cġgjjv e'euZ nq Zv mvariYZ mbtgr<sup>3</sup> 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<sup>u</sup>Y<sup>m</sup>ZZvi mvt\_ DEi cġvtb m<sup>s</sup>Z|

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

- mgm`v wPwYz Kiv|

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

Mtel tKi Gictii c` tġc nj wZwb GKwU KvhRi w<sup>x</sup>všlMhY Kitġb|

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

GB w<sup>x</sup>všlU MtelKtK Dch<sup>y</sup> cirġtYi gva`tg cġvY KitZ nte| m<sup>z</sup>ivs ZvtK  
cġqRbxq l Dch<sup>y</sup> tools ev nwiZqvi mbr<sup>3</sup> KitZ nte|

Dctii mgm`wU AbvgZ w<sup>x</sup>všl m<sup>u</sup>tU tKvb w`i e`vL`v tctZ ntj MtelK wntmte  
Avgiv miwmi mġġvKvi, cġgjjv, BZ`w` wefbaaitbi nwiZqvi e`envi KitZ cwi |  
cieZġZ Z\_`ek; ntZ representative sample ev cġZwbazkxj bġbvi gva`tg Z\_`  
msMh Kie| hw` cġgjjv e`envi Kwi Zte cġgjjvi gva`tg th Z\_` cvlqv hvte  
tm\_ tjtK ce`wba<sup>o</sup> Z wKQywbqg Abgytbi tkYx<sup>x</sup>KiY KitZ nte| Gici Z\_`  
wek- lY Kti th msuġB ifc cvlqv hvte Zvi mivnt` AbvgZ w<sup>x</sup>všlU Avgt` i hvPvB  
Kti t`L tZ nte|

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

hw` `Qfite tKvb w<sup>x</sup>všl tġvtbv m<sup>e</sup> bv nq Zvntj Avgt` i w<sup>x</sup>všl cwi gvRġ  
KitZ nte ev crġtZ nte Ges cwi gwR<sup>z</sup> hypothesis Gi Avtj vtK bZb Kti Avevi  
Z\_` msMh l wek<sup>d</sup>Y 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 |



### **cvtvi`i gj`vqb- 1**

- **msw`jB DEi c`kæ**

1. wk`qv Mtel Yv cwi Pij bv Kivi weifbæavc wK?
2. wk`qv t`q`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 ` 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 |



**2**

**Metode Kuantitatif**

**Definisi**

GB metode Kuantitatif —

- ◆ Z\_ msMni mfwbfactKSkj i bvg ej tZ cvi teb;
- ◆ Metode Kuantitatif Abnyti tKSkj mbr<sup>3</sup> KitZ cvi teb Ges
- ◆ Metode Kuantitatif e'eüZ DcKiY mbr<sup>3</sup> KitZ cvi teb|

Metode Kuantitatif cöqvRbxqZv t`Lv i` f` j ubw` © mgn`vgj-K Metode Kuantitatif cwi Pij bv Metode Kuantitatif cöZövbmn mfwbfactöZövb Kti v`fK| thgb, tKvb ikí cöZövb tKvb GKiu mvgMö Drcv` b Kti evRviRvZ Kij| Gici D<sup>3</sup> cöZövbU`K cöZövbqZ evRvi Metode Kuantitatif ev market research Gi gva`tg D<sup>3</sup> mvgMöUi Pwn`v I , Yv, Y m`úfK`Z\_ msMö KitZ nte| A` i ikí cöZövbU`Z GKiu Metode Kuantitatif v`vKtZ nte hviv G mg`l msMpxZ Z\_ msMöce` tkYex Kti mfwbfactvwi msuL`K tU ÷ cöqvM Kti w`kkl Yag` dj v dj `Zwi Kiteb|

Metode Kuantitatif Metode Kuantitatif mfwbfact Kti th tKvb i` K m`fÜ Metode Kuantitatif cwi Pij bvg AvMö` trvb bv tKb Z`K Z\_ msMö KitZ nte, cöqvM Abnyti mvrvtZ nte, statistical ev ch`j vPbvgj-K w`kkl f`yi gva`tg dj v dj msMö KitZ nte| Metode Kuantitatif h` tkYx Metode Kuantitatif nb Ges h` w`zb tK m ÷ w`lgj-K KvR Ktib Zte Zv cieZ`Z w`bRi tkY`ZB cöqvRbtefta cöqvM Kti Gi Dc`hwmZv cix`v KitZ cvi teb|

t`Lv hvt`O Metode Kuantitatif KvRi Rb` Avgv`i Z\_ msMö KitZ nq, tkYex KitZ nq, msi`v KitZ nq, cix`v KitZ nq|

GB cviV Z\_ msMö msp`vš mfwbfact Kti Av`j vPbv itq`Q|

`eÁmbK Metode Kuantitatif Z\_ msMni Rb` cöqk Metode Kuantitatif KvR KitZ nq, cöqvRbxq hšc`vZ mvr`tq DcvÉ ev dj v dtj i Rb` cö`w` w`bZ nq| Metode Kuantitatif hLb Metode Kuantitatif ZÉ`xq avi Yv w`bq KvR Ktib ZLb Zvi w`kkl tKvb hšc`vZ bv ntj I w`zb KvR KitZ cvi b| w`Š' e`enwi K Metode Kuantitatif KvRi cökv. w`fb`

Metode Kuantitatif Metode Kuantitatif th KtqKiu c`w`zi cöqvM Rb`cö` tm m`fÜ Z\_ Avgiv BD`u 2-G tct`q| cöZ`K cöv`i i Metode Kuantitatif w`QyDcKiY e`envi KitZ nq| Avgiv cö`tg Rwi c Metode Kuantitatif DcKiY w`PyZ Kwi |

cögy`vi gva`tg Z\_ msMö Kiv nq| cögy`v mvr`vrKvi cövbKvixi mvg`tb Dc`vcb Kiv nq| w`zb `v`i Ávb m`úbe m`pZb Ges w`j w`LZ DEi cöv`tb m`vg ntj Av`Kvsk t`f` w`bRB cögy`vi DEi cövb Ktib| AZ`š' e``l cökvzi DEi `vzv ev w`bi`i e`w`b` t` tejvq m`e` ntj "type-recorded interview" m`úw`Š DcKiY e`envi Kiv DvPZ|

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 weifbæAwfÁ-wfiwI DcKiY e`envi Kti `f Zg mgtaqi gta` Dchŷ `ŷZv ARŷb mrvqZv Kiv nq|

**D`niY**

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

Gt`i j ŷŷ`j hŷ wczvqvZv 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 cxwZtZ Mtel`Ki cKwZi Dci wbf`P Kti DcKityi cKvif` | GB aiti bi chŷeŷYthvM` DcvE wZb aiti bi nq –

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

gvV chŷq weewZgj-K ev narrative DcvE msMŷ Kitz ntj MtelK wbtRB tkYxKtŷŷi wczvbi tetÁ etj chŷeŷY Kitz civ`ib| G mgq wZvb Wvqix, tviU, Rvbŷ, AwWI ev wfiwI avi YthvM` DcKiY mt½ wbtZ civ`ib|

welqx Abyvb cxwZtZ chŷeŷYti gva`tg, cKŷvjv, mvŷŷvKvi 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  
mvŷŷvKvi, WvKvthvM cKŷvjv tŷŷY, gvVKgŷ i mrvqZv, BZ`w` Dtl`L Kiv Pj |

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



**civ`VvEi gj`vqb - 2**

- msiwŷB DEi cKæ
  1. Z\_` msMŷ tKŷkj wntmte cKŷvjv gva`tg mvŷŷvKvi – eYŷv Kiab|
  2. cKŷvjv gva`tg th mvŷŷvKvi MŷY Kiv nq ZvtZ cKævZvi wK wK `enkó`  
\_vKv cŷqvRb?
  3. chŷeŷYthvM` DcvE KZ cKviti i nq?
  4. weewZgj-K DcvE msMŷ Kitz ntj MtelK wK cŷLqv AbyviY Kiteb?
  5. wkŷŷv MtelYv tŷŷŷ DcKityi cŷqvRbxqZv mstŷŷŷc e`³ Kiab|

**cW 3**

**Z\_ msMh tKŠkj I DcKiY : cŃqM I mgve×Zv**

**Dfík**

GB cW tktl Avrb —

- ◆ *ukŃv MtelYv KvŃRi Rb cŃqvRbxq Z\_ msMhni tKŠkj mbv<sup>3</sup> Kiž cviŃeb Ges*
- ◆ *weŃkl tŃŃŃ DchŃ tKŠkj cŃqM c×wZ eYbV Kiž cviŃeb|*

*Avriv ceŃZP`Bw cvŃV Rvbjvg MtelYvi cKviŃf` Ges eŃžZ cviŃvg MtelK`Ńji w`iKZ.Dfík` Ablyvx wfbærfbæDcKiY e`envi Kiv nq| GB cvŃV Avriv Z\_ msMh Kivi KŃqKwU tKŠkj m=ŃU AvŃj vPbv Kie|*

*Avriv`i me mgq gtb ivLžZ 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 GKwU cŃkæ mgm`v ev cŃ:Â \_vKŃe, DcvE msMh Kiv nŃe; DcvE weŃk- IYceŃ e`vL`v cŃZ Kiv nŃe| DcvE Aek`B wbfŃŃhVM` Ges h\_v\_ŃnžZ nŃe|*

**Dcv<sup>3</sup> vKfite msMh Kiv m=Ń?**

*tU=útj U, tPKuj ÷, AaŃ`hi Z mŃŃŃvrKvi, repertory grid cŃkqvj v e`envi KŃi –*

*MtelK`j Zv`i cwiKŃbv chŃq w`i KŃi tbb tKvb aiŃbi KgŃ`i mnvqZvq vK aiŃbi DcKiY e`envi KŃi tKvb cŃuqvq Z\_ msMh KiŃeb|*

**cŃZKZ cŃqvj v**

*cŃqvj vi gva`tg Z\_ msMh Kivi cŃqvRb hw` gvVKgŃvbtqM Kiv nq ZŃe MtelYvi Dfík` Ablyvx thb DEi AvŃm tmw tK j ŃŃ` tiŃL gvV KgŃ`i DchŃ cŃkŃŃY w`žZ nŃe| DEi`vZvi DEŃii`ŃQZv, mZ`Zv thb weŃNvZ bv nq vKsev DEi`vZv thb LvgtLqvj x DEi cŃvb bv KŃib Gw tK gvV KgŃ`i AZ`šmRvM \_vKžZ nŃe| gvVKgŃ` th me weŃŃq tLqvj ivLŃeb tm,Ńjv nŃ`Q– DEi`vZvŃK GgbfŃe cŃkæKiŃeb bv thb Zu`ŃZk<sup>3</sup> DEi w`žZ AcviM KŃi| gvVKgŃ` DEi`vZvŃK mnvŃ` Kivi Rb` bvbvi Kg visual aids e`envi KižZ cvŃib|*

*cŃqvj v cŃZKivi mgq tLqvj ivLžZ nŃe thb MtelYvi cŃqvRtb th aiŃbi Z\_ tLwRv nŃ`Q , iæZŃŃcŃkæ gva`tg Zv AZ`šm vKfite thb cvlqv m=Ń nq| [mživš cŃŃgB MtelK`j vK aiŃbi Z\_ Pvb Zv mŃŃŃŃŃfŃe tŃvU tŃvU evŃK`i gva`tg wj ŃL thŃeb|*

**tKŠkj MZ e`vL`v**

*cŃwK Ae`vq m` cŃkŃŃY cŃB gvV KgŃMY mŃvKfite cŃqvj v e`envi KižQb vKbv tm m=ŃU wŃŃZ nŃl qvi Rb` KŃqKwU DEi MhY chŃq AwŃI tiKwŃŃ Gi e`e`v Kiv*

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

**chfeqtYi gva`tg Z\_` msMh**

**wZxq tKSkj**

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

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

**ZZxq tKSkj**

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

gj- MtelK `tj i m`m`e,` hw` wbtRiv gvV chfeqi Z\_` msMh bv Ktib Zte gvV  
Kgf`i Rb` GKwU wbt` Rgvjv `Zvi KitZ nte hvZ Zviv wbtRi`i KvrwU Kivi myúo  
Bw`Z cvb| tKvb c`æ`axti axti Kiteb, Klb w`ivg MhY Kiteb, Klb c`k`wU  
wZxqevi D`PriY Kiteb, Klb DEi`vZvtK w`Sv` KitZ ej`teb BZ`w` Bw`Z`\_vKte  
GB wbt` Rgvj vq|

GB cvtV Avgiv t`L`tZ tcjvg MtelYvi cU`qvRbxqZv mbv<sup>3</sup> Kiv, Df`k` wba`Y Kiv  
thgb `iaZcY`wK tZgub `iaZcY`Z\_` msMh tKSkj wba`Y Kiv Ges Z\_`  
msMhKvix`K c`k`qtYi gva`tg mwKfite cU`Z Kiv|



**cvtVvEi gj`vqb- 3**

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

**cW 4**

**mvḡvrKvi tKŠkj**

**Dḡiḡ**

GB cW tḡi Avcb—

- ◆ mvḡvrKvi tKŠkj i `enkó" mbv<sup>3</sup> KtZ cviḡeb;
- ◆ mvḡvrKvi tKŠkj i cKviḡf` wj LtZ cviḡeb Ges
- ◆ Mḡel Yv mvḡvrKvi i %ekó" eYḡv KtZ cviḡeb|

**mvḡvrKvi**

Mḡel Yvi Z` msMḡ tKŠkj wntmḡe e`eüZ mvḡvrKvi gj-Z wZbW `enkó" gwÉZ nḡ  
\_vḡK|

- Mḡel Yvi Dḡiḡi cḡ`ḡ cḡZdj b wntmḡe mvḡvrKviḡK cḡvb Z`  
msMḡni Dciḡ wntmḡe 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 wntmḡe e`envi Kiv mḡe|

mvḡvrKvi tKŠkj mḡḡK tḡvUvḡḡ Pvi fvM fvM Kiv nḡ|

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

cḡḡB Avḡiv ḡḡMḡel Yv mvḡvrKvi ḡḡ avi YvUvi mḡ\_ cwi wPZ nB| Bḡi wR msÁvU  
wḡḡc—

“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 ifcvšḡi Z Ktḡ msÁvU wḡḡc nḡZ cviḡi—

mvḡvrKvi MḡYKvi x KZR.Dl wcz `ḡ e`ir<sup>3</sup> i Kḡ\_vcK\_b tK Mḡel Yv mvḡvrKvi ej v  
nḡ hLb GB Kḡ\_vcK\_ḡbi gvaḡḡ Mḡel Yv msḡvš cḡqvRbxq Z` msMḡ Kiv nḡ|  
GLvḡb mvḡvrKvi i ce`wbaḡi Z welqe` Mḡel Yvi Dḡiḡi Dci wḡfḡkḡ Ges  
mvḡvrKvi i GKw mḡyúo ḡḡl GB Dḡiḡi KZR.wPwḡZ \_vḡK|  
UvKḡvb Mḡel Yv mvḡvrKvi i KḡKw `enkó" mbv<sup>3</sup> Kḡiḡb thgb,

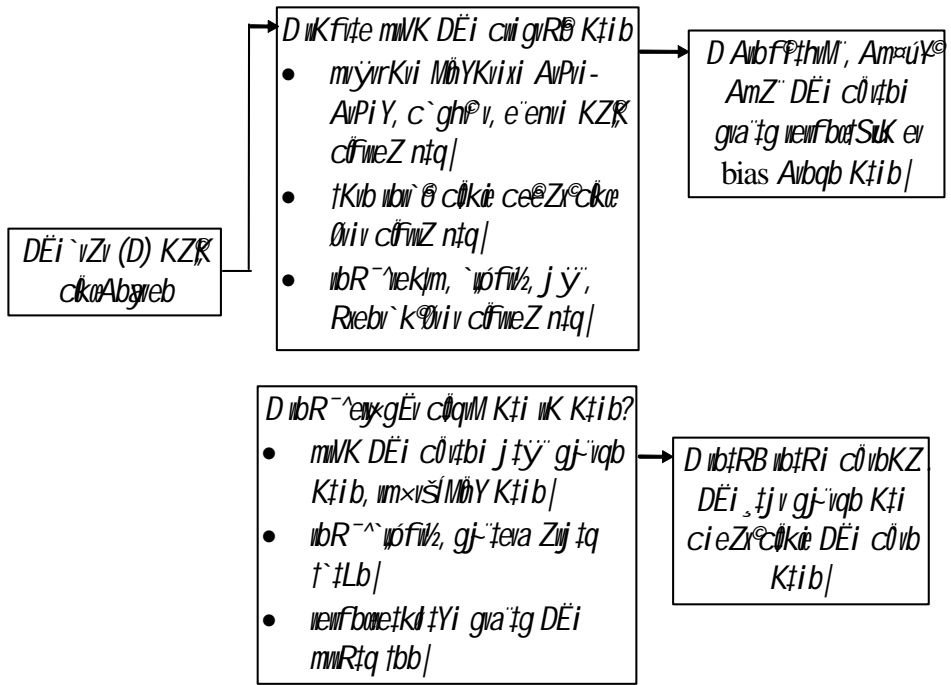
- GB ai#bi Kv#Ri Rb` mv#vrKvi MhYKvixi c0qvRb nq|
- Dch# e`w3 ev e`w3eM#K A\_#mrvh` c0vb Ki#Z nq|
- c0#Kivi ht\_0 m#av\_v#K GB tKSk#j |
- Z\_` ms#KvP#bi c0# m#ebv i#qtQ|
- mv#vrKvi `vbKvixi msL`v c0#vjvi mrvh` msM#xZ M#el Yvq AskMhYKvixi tP#q A#bKvst#k Kg nq|
- msM#xZ D#i i msL`v c0#vjv M#el Yvi tP#q te#k nq|
- Z\_` we#fb#Kvi#Y weKZ.ntZ cv#i, Gi g#a` i#qtQ mv#vrKvi MhYKvixi `#Zv, DcKi#Yi m#ve#Zv, Z\_` c0#ve#Ki#Yi m#ve#Zv BZ`w` |

Avgiv Gevi Dc#i#vj - wLZ Pvi c0#vi 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 c0#Zi n#e Zv mv#vrKvi MhYKvix#K Rvb#q t`lqv nq d#j c0#k# aviv cv#eZ#bi tKvb `#axbZv Zvi\_v#K bv|
- Unstructured mv#vrKvi Ab`c#` D#` ai#bi A\_# GL#b mv#vrKvi MhYKvixi `#axbZv eRvq\_v#K| M#el Yvi c0#vRb#qZv Ab#v#q 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 tLivcx ev g#b#`#v#bK mv#vrKvi ai#bi| GL#b mv#vrKvi c0#vbKvix Zvi B`Qv Ges #gZv Ab#v#q Zvi gZev` ev Ab#v#Z c0#v# K#i, A\_# GL#b mv#vrKvi MhYKvix gj-Z tKvb c0#vi 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 thwU 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#vU`c0#Z Kiv nq|

M#el Yv mv#vrKvi c0#qvq hw` mv#vrKvi `vbKvix mwK D#i`vb c0#Z\_v#Kb Ges MhYKvix cv#i `w#i K m#u#K`v#c#bi gva`g hw` c0#ZwU c0#MhY#h#M`Zvi m#t\_ D#vcb Ki#Z cv#ib Z#e GB tKSk#j i gva`g t#vUv#v# 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|



**OK 3-4.1 : DĒi ṽZvi `enkó` aviv**

Dcġi QṽK t`Lvb nj DĒi ṽZvK DĒi cġvbi Rb` wK aiṽbi cġwZ MḥY KiṽZ nq Ges tKvb cwi w`wZṽZ ev wK Kvixi cġE Z`i wbfPthvM`Zv nwm tctZ cġti | Avgiv ejṽZ cwi cġgṽj vi gva ṽg mWK DĒi cvl qv wbfP Kti “shared meaning” ev ḡḡA\_© FvMvFvM Kiv ḡ tKškj D`metḡbi Dci | KvṽRB DĒi msMḥ Kiv ev Z` msMḥ Kiv c`wZw Ggb nte thb Gi gva ṽg DĒi ṽZvi wv ḡ j`wfgṽL DĒi cġvbi ṽlgZv ewx Kti | DĒi ṽZv h` mWK DĒi ṽb c`wZ t`K `ṽi mṽi hvb Zte wZwb th aiṽbi DĒi cġvb Kiṽeb Zv invalidity Avbqb Kiṽe | MṽelK `tji gvKgp ev mṽṽvrKvi MḥYKvixiK G mg`l e`vcġi mṽPZb t`K j`ṽtji wKUNṽZ wbfPthvM` I cġZ.Z` msMḥ KiṽZ nte |



**cvṽVĒi gj-vqb- 4**

- **mswṽB DĒi cġae**
- 1. MṽelYvi Z` msMḥ cġuqvi Ašfṽ mṽṽvrKvi tKškj KZ cġvṽii?
- 2. MṽelYv mṽṽvrKvṽi gj-`enkó` wK wK?
- 3. wṽ`wKZ ev tK>`wqZ mṽṽvrKvṽi mṽ\_ web`vmKZ.mṽṽvrKvṽi gj- cv`R` wK?
- 4. DĒi ṽZv KZ cġvṽi cġE Z` ev DcvĒtK wbfPthvM` A\_ ev AubfPthvM` Kti ZṽZ cvṽi?

**cW 5**

**ckgvyv: cÖZ cÜvj x I e`envi**

**Dfik`**

GB cW tkfI Avcwb—

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

ukvIv MtelYvq D`Pzi e`AmbK MtelYvi gZ tkvb `vgx, RvUj MtelYvMvi, m` hšcwiZi e`envi bv ntjI Pj | uKš` MtelYvi uKQyDcKiY e`envi Ki tZB nte| ckgvyv G ai tbi GKw DcKiY| Avgiv G cvtV ckgvyv cÖZ Kivi mvavi Y uKQy bqg uKLe Ges cÖZKZ.ckgvyv uKfvte e`envi Ki tZ nq ZvI t`Le|

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

ckgvyv wZb cKviti— WvKthvM tCöZ ckgvyv, `tji Dci cÖvMKZ.ckgvyv, e`v<sup>3</sup>MZ mvvIvzi mgq e`eüZ ckgvyv| mvvIv Avb m`ubæGes cÖkæ , iaz; Abæveb Kti vR`^AvMh cÖZw cÖkæ mWK DEi vPvYZ Kiteb ev vj Lteb j v`j `tji `enkó` m`fÜ GiKg m`æbv vKtj B WvKthvM ckgvyv tCöZyi gva`tg DcvE mSMh Kiv m`æ nq| Avgiv GiKg GKw e`envi t`L tZ cvB 1972 mvvj MWZ ÖÖRvZxq ukvIv Kvgkbö Gi Kg`cÜvj tZ| GB Kvgk tbi v`t cvtU`vbtar<sup>3</sup> D t j k i t q t Q:

ÖÖAvgv`i ukvIv e`e`v I Zvi vewfbæmgm`v m`ú tK`RbgZ hvPvBtqi Rb` GKw ckgvyv t`tki vewfbæ`t i i ukvIv cÖZövb, bvbvæa ms`v, ukvIveZx, ukvIve` Ges tbZæ`i vBKU tCöZ nq| ckgvyv uM msev`cI gvi dZl cÖvvi Z nq| G e`vcti tek Drvine`ÄK mvor cvl qv tMtQ| cÖB Reve, vj KivúDUvi Övív vekt- IY Kiv ntqtQ|ö

**cÖZcÜvj x**

ckæv ckgvyv `Zvi Kivi mgq uKQy, iazcY`bqg tgb Pj tZ nq, thgb:

- uK ai tbi Z\_` cÖqvRb Zv vbfv fite vbyq Ki tZ nte|
- ckgvyvi bKkv vbafti Yi tKskj vPvYZ Ki tZ nte|
- cÖqvRbxq Z\_` tK mnRteva` cÖkæ gva`tg Z t j ai tZ nte|

ckæ` v cKviti i nZ cvti – ÖtKi AvKviti Ges gZvg tZi AvKviti ev tLvj v DEi |



**QtKi AvKti ev ħw̄ θ DĒigj-K cġk** [Fixed response (closed) questions]

G aiġbi cġk DĒi `vZvi gZvgZ cġk vti mġħvM \_vġKbv ħKŠ MteIK Aí cwí kġg DĒi meġk- lġYi gvaġg ħm×vġŠlġcġvġZ cġi b|

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

GLġv DĒi `vZv Aí K\_vq tKvb ħw̄ θ meġq Zvi ħBR`^gZvgZ e`^3 KiġZ cġi b|

**cġgġv `Zwi l cġqMi c`ġc**

- mġm`v ħw̄ θ Kti ħ`i KiġZ nte tKvb cġk vti Zġ`i gvaġg DĒi cvl qv m`e|
- (Dctivj - ħLZ) `θ cġk vti gġa` tKvbġvġZ KZġġ cġk Kiv nte?
- cġg Lmov cġZ KiY|
- bgġv DĒi `vZvi gvaġg Lmov cġgġv vi MVb ħvPvB|
- cġB mġvġvPvvi ħfġġZ cġg Lmov DbZ KiY l Povi cġgġv cġZ Kiv|
- ħw̄ θ j ġġ`ġj i Dci cġgġv ħġ cġqM|

**ciYKZ cġgġv tdir cvl qvi ci ħv Kiv nq Zv nġ`Q –**

- cġB ciYKZ.cġgġv vi DĒi tkYxex Kti meġkġ Y Kiv|
- DĒi i ħfġġZ Povi ħiġvU`ev ġj- cġZte`b `Zwi Kiv|

**cġgġv `Zwi Kivi mġq ħġgē meġq, ġjvi cġZ `w̄ ħġZ nte A\_ġ cġgġv vi `enkó` nte ħġgēc–**

- cġgġv ħġ thb AvZwi`^3 eo bv nq|
- evK` thb mnRġeva` Ges tQvU nq|
- cġkē ġj-e`^3e` thb , iazġY`Ges `úofġte e`^3 nq|
- cġkē DĒi t`evi ġġgZv B`Qv, Drmġv thb j ġġ`ġj i \_vġK|
- ħġt` ġKZ cġkē (leading question) thb ġġZ bv \_vġK|
- ħeġf bacġkē meġq e`i ġġa` thb avi v eRvq \_vġK|

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

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

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

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

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



**cvŷVvEi gj`vqb - 5**

**• msuŷŷB DEi cŷæ**

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|

**fiçKv**

Pj gvb ev eZçvb Ae`v chçj vPbv Kçi DbçZi fiel`r MVb Kivi j tçj` gvbly eüKvj t\_tKB Mtel Yv Kçi AvmtQ| c`vci vtm wj Lb c×wZi Avne`vi, `çi i gvbçji mvt\_ thvMvthvMi Rb` tUvj Mçdi Avne`vi t\_tK` i iæ eZçvb tUvj thvMvthvM e`e`vq B-tçBçji eüj e`envçi i mçhvM Mtel Yvi gva`çgB GçmtQ|

Mtel Yv bZb tKvb ZtEji cçqvRtb, bZb tKvb cçqvM e`e`vi mÜvçb cwi Pvj bv Kiv nq| mZ` mÜvçv wntçte Mtel Yv KvR cwi Pvj bv KiçZ ntj mçv`ç cwi Kí bv Abçvçq KvR KiçZ nq Ges Mtel Yv KvçRi Rb` A\_ç mgq I tçvKetji cçqvRb nq| tKvb Mtel Yv KvçRi cçqvRbçvçv t`Lv wçj tKvb GKK Mtel K ev Mtel K`j Mtel Yv KiçZ B`Qç ntj G KvçRi cçg c`ççc nj Mtel Yvi GKw cççç cwi Kí bv ev proposal cçZ Kiv|

Avçiv GB BDıbu Mtel Yv tçcivRij cçwZ Ges e`envçi i wewfçvçv K wçq Avçj vPbv Kie|

- civ - 1 Mtel Yv tçcivRij : çiaZçvçv K
- civ - 2 A\_ççv
- civ - 3 cçRçi eYçv
- civ - 4 cçRçi Kvççj vç
- civ - 5 Mtel Yv cçR± : D`vni Y
- civ - 6 Z\_`çi dvçivçs tçççj
- civ - 7 Mtel Yv m`çç Kvççv I cçZKi Y

**civ 1**

**MtelYv tctcivRij : , iazpYq K**

**Dfik`**

GB civ tkfI Aircib —

- ◆ tctcivRij cŃZ Kivi wefbaŃ K, tjv mbr<sup>3</sup> KitZ civteb|

tckvq ubtqmRZ t\_tK tckvMZ tKvb mgm`ivi mgvaib LtR tei Kiv ev bZb tKvb ZtEj Avne`vi ev tKvb Dbqb cKt`i mvdj` gj`vq`bi cŃqvRtb MtelYv Kiv nq| MtelYvi cKwZ tgŃj K, e`enwi K ev KvthfcthvMx th aitbi tnvK bv tKb GKvtR` iia t\_tK tkl chŃ AZ`Ń cwi Kw Zfvte GtMtZ nq| MtelKe,` KvR Kivi Rb` ZvB cŃtgB GKw KihRi cŃtecI ev tctcivRij` Zwi Ktib Ges GB tctcivRij Abjvfi KvRw cwi Pvj bv Kiv nq| Ae`v wetkI KvR PjvKvjxb mgtq GtZ Af we`li cwi eZŃ, cwi gvRŃ Kiv ntj I cŃwgKfvte cŃZKZ.cŃtecI ev proposal AbjvfiB gj-Z KvRw Pj |

tctcivRij i ifctiLv` Zwi mgq th w K, tjvi cŃZ` wŃ w` tZ nq Zv nt`Q—

- mgm`w Abjvteb Kiv|
- mte` mgvav`bi w K ubt` Rbv tLwRv|
- mte` mgvaib mbr<sup>3</sup> Kiv|
- cŃ`wkZ djvdj Ges mjev eYŃv Kiv|
- mgvaib ARŃbi jtŃ` MpxZe` c`Ńc ubYŃ Kiv|
- MtelYv KvR cwi Pvj bv Kivi Rb` cŃqvRbxq m`ut`i cwi gvY ubaŃY Kiv|
- mgvav`bi mtebv ce`gj`vqb Kiv|
- cŃ`wkZ DcKvi ev mshvM cjt gj`vqb Kiv|
- djvdjt i cwi gvYmgŃ mbr<sup>3</sup> Kiv|

GB bqw c`ŃŃci Dci wfvE Kti maviY tctcivRij cŃZ Kiv nq|

MtelK`j cŃqvRb tevta GB bqw , iazpYc`ŃcŃcŃ GK ev GKwaK QtKi AvKvfi wj wce x KitZ civtib|

**QK 4-1.1**

mgm`w Abjvteb Kiv	Avtj vPbvi gva`tg mgvaib tLwRv	mgvaib mbr <sup>3</sup> Kiv	cŃ`wkZ djvdj I mjev eYŃv Kiv	mgvaib ARŃbi jtŃ` MpxZe` c`Ńc mgn

**OK 4-1.2**

cᚕqvrBiq mᚗÚ`	mgvartᚑi mᚗᚕebv cᚑt gj`vqb	cᚕ`wKZ mᚑhvᚑMi cᚑt gj`vqb	dj vdtᚑ i cwi gviY

**mgm`v Abᚑieb Kiv**

**cᚕg c`ᚑᚒc**

MᚑelK (ev MᚑelK `j) ᚑK cᚕᚑgB mgm`v ev MᚑelYv Kivᚑi cᚕqvrB mᚗᚑÚ` ᚗᚗ aviYv MoᚑZ nᚑe| ᚑKvb wᚑᚑKl NvUwZ ev NUbvi cᚕqvrB ev kᚑZᚑ KviᚑY GB wᚑᚑKl mgm`vi Dᚑᚑᚑ nᚑᚑᚑQ ev cᚕqvrBiqZv ᚑ`Lv wᚑᚑᚑQ Zvi mᚑᚑᚑᚑ Dᚑᚑᚑ ᚑᚑKᚑZ nᚑe ᚑcᚕᚑvᚑᚑᚑ |

**Avᚑj vPbv gva`ᚑg mgvavb ᚑLᚑRv**

**wZᚑq c`ᚑᚒc**

`ᚑᚑi mKj m`m` Avᚑj vPbv, chᚑᚑj vPbv Ges ceᚑZᚑ NUbvmgᚑ chᚑᚑᚑᚑᚑᚑ gva`ᚑg mgm`vUᚑ GKwU mᚗᚑᚑᚑ mgvavb ᚑLᚑRvi c`ᚑᚒcmgᚑ wPwᚑZ Kᚑib| cᚕZ`K m`m` cᚕqvrBiq mSL`K AZᚑZ Z` ᚑLᚑRv ᚑ`ᚑK i iᚑKᚑi ᚑᚑᚑᚑ fᚑᚑᚑ wPᚑᚑᚑ Kᚑib Ges GKwU Av`kᚑmgvavb ᚑᚑᚑZ nᚑᚑ wK Kiv DᚑᚑZ Zv mbvᚑᚑ KᚑᚑZ ᚑᚑᚑᚑ Kᚑib| i agᚑᚑ A`ᚑ fᚑᚑᚑ ZᚑK mgᚑᚑᚑᚑᚑ gᚑᚑᚑ bv Gᚑᚑ mgvavbUᚑ j s Uvgᚑᚑᚑᚑᚑᚑᚑ Zv ᚑLᚑRv DᚑᚑZ| GKB mgᚑᚑ A`ᚑᚑᚑ mᚗᚑᚑᚑ wPᚑᚑᚑ fᚑᚑᚑᚑ i iᚑKiv nᚑᚑ|

**mgvavbmgᚑ mbvᚑᚑ Kiv**

**ZZᚑq c`ᚑᚒc**

mᚗᚑᚑᚑ mgvartᚑi e`vcᚑᚑi `j MZ fᚑᚑᚑ wᚑ`wᚑ Z I ᚑLᚑᚑᚑᚑᚑ Avᚑj vPbv mᚗᚑᚑᚑᚑᚑ qvi ci MᚑelK `j GK ev GKwᚑᚑK mgvavb wPwᚑZ Kᚑᚑᚑᚑ th`ᚑᚑᚑᚑ ciZ Zviv ᚑᚑᚑᚑ wᚑᚑᚑ Kᚑᚑᚑᚑ GB mgᚑᚑ MᚑelYvi hᚑᚑᚑᚑ ev rationale w`i Kiv nᚑᚑ| rationale wPwᚑZ Kivi mgᚑᚑ ᚑ`LᚑZ nᚑe

- GB hᚑᚑᚑᚑ i gva`ᚑg cwi Pwᚑᚑ Z MᚑelYvi dj vdtᚑ ᚑᚑᚑᚑ wPwᚑZ mgᚑᚑᚑᚑ ev target group Gi DcKvi nᚑe wKbv|
- MᚑelYvi cᚕqvrBiqZv Zᚑᚑᚑ aiv mᚗᚑᚑᚑ nᚑᚑᚑQ wKbv|
- ᚑKvb wᚑᚑᚑᚑᚑᚑ ᚑᚑᚑᚑᚑ mbvᚑᚑᚑ Kiv mᚗᚑᚑᚑ nᚑe wK?
- Ab`ᚑᚑᚑᚑ MᚑelK `j wK GKB mgm`v wᚑᚑᚑ GKB mgᚑᚑᚑ BᚑZᚑᚑᚑᚑ KivR i iᚑKᚑᚑᚑᚑ wKbv|
- A`ᚑᚑᚑᚑᚑ mᚗᚑᚑᚑᚑ KZLwᚑᚑᚑ|
- GB MᚑelYvi dj vdtᚑᚑᚑᚑ ᚑᚑᚑᚑᚑᚑᚑᚑ Ges fᚑᚑᚑᚑᚑᚑ MᚑelKMᚑᚑᚑᚑ DcKZ. nᚑᚑᚑᚑᚑ mᚗᚑᚑᚑᚑ wK cwi gviY|

**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**

**Kvh9máú`tbi c`tq/c máútkAvtj vPbv**

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

**lô c`tq/c**

**máú`i c0B I c0qvRbxqZv**

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

**mBg c`tq/c**

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

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

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

cZ`wkZ dj cvlqv hv`Q G máú`U wvDZ 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 tc0cvRvj wKlb cxwZ máú`U 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 mgyvexZv wbtq Avtj vPbv Kie|



**cvfVvEi gj`vqb - 1**

- mswfjB DEi c0æ
1. MtelYv tc0cvRvj c0Z Kivi \_iaZjKZLwb?
  2. tc0cvRvtj i jctiLv `Zwi Kivi mgq tKvb w`K `wó w`tZ nq?
  3. MtelYvi thšw3KZv ev rationale wbaftY Kivi mgq tKvb w`K\_ tjt 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" cwiġgvY 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 msMġixZ Aġ\_P GKġU šbv`Ų Ask weġfbæcġqvRbxq I Rb\_ iæZcYġġ ġKi MġelYv KvġR Abÿvb, ġġvb šntġte cŲvġbi Rb" šbv`Ų Kġi ivġLb| mgvġRi abx, weĤKvj x e"ġ³, Rb`i`x, mgvRġmex e"ġ³MY ġKvb šbv`Ų ġġKi MġelYv KvġR cġqk A\_ĊAbÿvb šntġte cŲvb Kġi \_vġKb|

MŲU Ges Pġ³ ġfiĤK KvġRi aviv mġġU cwiġPZ nl qv ġvK Gevi| GB `BġU kġ Avġiv AġbK mgq mgv\_Ĥ šntġte e`envi Kiġġl ġġi ġta" , iæZcYġġġ- cv\_Ĥ" iġqġQ| ġKvb e"ġ³ MġelK ev MġelK `ġġK hLb Zvġ`i šbR`MġelYv KvR Kivi Rb" A\_Ċmġrvh" ġ`qv nq ZLb ZvġK etġ MŲU| Acicġġġ ġKvb divġ, ġġRġYx hLb šbv`Ų Pġ³ cġġi ġva`ġg ġKvb `ġ, ġMvŲ ev e"ġ³ weġġtli ġKvb šbv`Ų 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`vmġR RbMYġK ġmev cŲvġbi Rb" mi Kvix cġZŲvb ev th ġKvb Aj vġRbK ġKsev j vġRbK (profit) ms`vi mġġ\_ thġMġthvM `vcb Kġi| ġ ġġġġ K>Uġ± Gi ġva`ġg A\_Ċmġrvh"ĊÜß MġelK ev MġelYv ms`v MġelYv KvRġU cwiġPġbv Kġib| MġelYvi weġqe`; c×ġZ mspġvšġ ġġ- šġ`Rbv ev Kgġc×ġZ šġqvmKvix ms`v ġK Kġi \_vġKb| ġaiġbi KvR AvBbMZ šbġġbġZi Avl Zvq Kiv nq|

MŲU cÜßi ġġġġ MġelK `ġ ev ms`v šġġġi cġġm Ges MvBW Gi bġvZġġv Abÿvġi KvR Kivi Rb" iġġġ A\_ĊÜßi Rb" Avġe`b Kġib| ġġġġġ A\_Ċmġrvh"Kvix ms`v ġKvb šġ`Rveġġ ġ`b bv|

Dfqt`f`IB Aek` wbgZwšK c`uqvq h\_vh\_ KZ`f`fi wBKU Avte`b KitZ nq/ A\_`c`vbkvix ev mrvh`Kvix c`Z`vb G mg`f`Avte`b mekIA KvguUi gva`tg hvpvB ceR Dch` c`Kí ev mgm`v wU evQvB Kt`b| mvaviYZ GB mekIA KvguUi cwvPq mrvh` c`\_R KvQ tMvcb Kiv nq|

e`w`MZ `vb ev Ab`yb mvaviYZ dvDf`Ukb ev Ktc`i k`bi gva`tg cvl qv m`e|

AwaKvsk t`f`f` MY gva`tg c`vi ev we`vBi gva`tg G mg`f`msev` c`vi Kiv nq|

Avgiv Gevfi t`kxq `B GKwU KvRi D`vniY t`Le|

**D`vniY 1**

evsjv GKvWgx ewl`R mvaviY mfv (1998) Gi Kv`weeiYxZ GiKg `B GKwU D`vniY mbr` Kiv m`e|

**D`vniY 2**

1997-98 A\_`Qi t`f`K GKvWgxZ wZb eQi tgq` wZbvU MtelYv ewE c`vb Kiv ntq`Q| weiqe`\_tjv wj Rxebv` `v`ki KweZvi `f`c Aš`f`Y, b`b ZE; cwv`c`f`Z evsj v`k KweZv, evsj v`k gy`hy I RvZmsN|

**D`vniY 3**

GvkqvuUK tmvviBwU Ae evsj v`k KZ`R evsj v`tcwvqv c`R` GKwU c`B`f`U Df``M| GB KvRi Rb` UGC, gvbbxq ivócvZ, UNESCO, miKvix mekte`ij qmgr, CIDA Ges tmvviBx e`v`K A\_`mrvh` c`vb Kt`f`Q|

GvkqvuUK tmvviBwUi gva`tg Avevi wekó e`w`em`KZ`R.th mg`f`MtelYv Ab`yb c`vb nq tm`\_tjv Avevi e`w`MZ ch`qi MtelKt`i Zv`i gy`Z MtelYv KvRi DrKI`Zvi Rb` c`y`Z.Kiv nq|

MtelYv KvRiUi c`qvRbxqZv, mg`f`v`thvMxZv, Ges Dc`v`cbKZ.KvRi `^QZv BZ`w` w`K wef`Pbv Kt`i ms`v Ab`yb ev K>Uv`-Gi gva`tg A\_`c`vb Kt`ib|



**cv`v`Ei gj`vqb - 2**

• **msw`f`B DEi c`kæ**

1. Kq c`Kv`i MtelYv KvRi Rb` A\_`cvl qv m`e?
2. M`U I K>Uv` MtelYv c`xwZi gta` gj` cv`R`\_tjv w`k?



### **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± KvfRi GKwU cY0 Ges `Q eY0v Qrov MtelYv KvR mdj Zv jvf Kiv Am±e| GKwU c0R± eY0vq wZbwU , iazCYAsk \_vK| G , tjv n±Q-

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

Avgiv Rvb, j±9`i gva`tg MtelYv Kg0i AZ`sf`ieZ0mgqmigvi c0Z `w0 ubeÜ Kiv nq| Ges Af mgq migvi 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\_`muvh` 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/PvriwU AvPivYK Dfík` wPvYZ Kiv m±e|

Dfík` 0 cKvfi nq – c0uqvmZ Ges djvdj MZ|

#### **c0uqvmZ Dfík` ev Process Objectives**

Kvg` j 9`-tj tc0v±bvi 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` wPvYZ 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 wPvYZ Kfi Ges Gi Dci KvR Kiv n±j wK ai±Yi djvdj cvlqv hvte ZvI Rvbr m±e nq| djvdj MZ Dfík`i gva`tg AvPiY, `9`Zv, `w0f0z, gj`teva, veklm, Avb Ges kZmg±ni cvi eZ0 m±tÜ Rvbr

mæ nq| mŷw`θfvte e<sup>3</sup> djvdjMZ Dfīk`i gta` wbtg<sup>3</sup> `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
- tŷŷMŷj K `vb ev cixʃfYi j ʃ`j |

Dfīk`i gva`tg j ʃ`j i eqm, wj ½, AvĀwŷ KZv wPwŷZ Kiv mæ| Dfīk` wj Lvi  
mgq action verb (thgb: eŷ× Kiv, msfKvPb Kiv, cŷkθ Kiv, Kwgtq t`qv) e`envi  
Kiv nq|

Dfīk` wPwŷZ Kivi mgq MtelK/MtelK `j fK Mfxi fvte wPŷf fvebv Kti w`i KiZ  
nte Zuv Avmtj wK Pvb –

ŌŌtKvb wefkl welfq j ʃ`j i Ávb eŷ× Kiv hvZ Kti Zv`i AvPiY cwi ewZ nq?ŌŌ  
tmfʃfĀ e`vcv wK GiKg th, j ʃ`j cŷqvRbxqZv Ávb AvQ wKB wKŷ Zviv  
KwŷʃZ I `v`mæZ AvPiY KiQb bv; A\_ŷ MtelYv djvdj cŷqvMŷi gva`tg axfi  
axfi GB j ʃ`j fK AvPiYi cwi eZθ NUvZ mæZ Kivbv mæ nte|

**D`niY**

Avgiv GKw cKwKZ weÁwŷi gva`tg ev`é D`niY t`LZ cwi– 1999 mtj tg  
gvfmi `wbtK cKwKZ GKw weÁwŷi Ask wefkl Zfj aiv nj| weÁwŷw cŷvi  
KtiwQj ŌŌwdfj tmfKŌvix `ŷ G`mm÷`vY cŷR±ŌŌ wKŷv gŷŷYj q|

Ōeŷjv`fk bvix wKŷvi nvi eŷ× Ges Dbqb KgRvŰ bvix mgvRi e`vcK AskMŷY  
wbuŌZ Kivi j ʃ`j t`fki 118w \_vbrq cKí f,<sup>3</sup> wKŷv cŷZŌvfb gva`wK `fii  
QvĀf`i Rb` DceŷĒ I wUDkb wd cŷvfb gva`tg QvĀmsL`v eŷ× cKfīi Ab`Zg  
Dfīk`|ŌŌ

GKw ep`vKvfi j ʃ`j ev`éqvfb Rb` ARŷthM` GKw Dfīk` wPwŷZ Kiv ntqQ  
GLvfb| Dfīk`i gta` tŷŷMŷj K `vfb eYŷv itqQ, j ʃ`j DfjL itqQ,  
BZ`w` |

**mveavZv**

cŷR± tcŷcvRv fj Dfīk` wj Levi mgq th w`fK `wŷ w`fZ nte Zv n`Q –

- GKw Dfīk`i gva`tg GKw gvĀ cwi gvc`thM` Outcome MY` KiZ nte|
- AvZwi<sup>3</sup> eYŷv thb Dfīk`i gta` mibteŷK bv nq|
- Dfīk` thb mnRfēva` Ges `úo nq|
- Dfīk`i eYŷv thb ev`évbM nq Ges AvkwZwi<sup>3</sup> cŷZÁv thb GfZ bv \_vK|

ḡ Ae GWKKb

weḡkI Kḡi A\_ḡvnh" MḡY Kḡi MḡeIYv KvR Kiḡj j ḡ" iḡLḡZ nḡe thb AḡZwi<sup>3</sup>  
Dḡḡḡk"i eYḡv cḡB dj vdj ḡK ḡḡhḡ\_ó bḡḡḡ eḡj ḡPḡYḡZ bv Kḡi | KvIY GiKg mḡḡebv  
ḡ`Lv ḡḡj mḡvnh"Kvix ms`v A\_ḡḡvḡb AmḡḡZ cḡvb KiḡZ cḡḡi |



### **cḡḡVḡḡi ḡj`vḡb - 3**

- **msḡḡḡB Dḡḡi cḡḡe**

1. MḡeIYv cḡRḡ tcḡḡcḡRḡḡj ḡḡvU KḡḡU , iḡZcYḡḡAsk\_ḡḡK?
2. MḡeIYv cḡRḡ KvRi ḡḡa" DḡḡḡLZ Dḡḡḡk" Kḡ cḡKḡḡi i nḡZ cḡḡi?
3. cḡRḡ tcḡḡcḡRḡḡj Dḡḡḡk" 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 weifb0Ask c0Z Kivi tKSkj 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 metPtq , 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 m0ub0Kiv nte|

mvi Yx 4-4.1 Gi gZ GKwU I q0KwU (work sheet) `Zwi Kfi KvR iia Ki`j tgvUvgv me , tj v KvhRj vc ij ice x Kiv m0e nte Ges tKvb Ask ev` c0tebv|

**mvi Yx 4-4.1: c0R± KvhRj vc ij ice x Kivi QK**

c0R±i Df`ik`mgn	cvi Kwí Z KvR ----- ----- -----		c0R± Kv`Ri gj`vqb
	KvhRj vc (c0Zgj-K)	ev`evqbKiv xb KvhRj vc	
c0Z`mkZ dj v dj ev DcKi Y`0K`0K			0K ai`Yi gj`vqtb gva`tg wBY0 Kiv nte th KvR c0Z`mkZ dj etq Gtb0?

**cvi cKwí Z KvR**

hw` 00gv I wki`i `r` m0PZbZv ewx Kiv00 ms0všf tKvb Mtel Yv KvR nvtZ tbqv nq Zte I qvRkxU Gi cvi Kwí Z KvR (Services planned) Astk wbgie`c Df`l` \_vKtZ cvi`i —

- 18-34 ermi eqmx gunj vt`i gta` 200wU 00`r` i 0v00 wDR tj Uvi gyY Kfi weZiY Ki`Z nte|
- 118wU \_vbvq cKí f,3 w00v c0Z0v`tb gva`wgK `fi i QvT`i DcewE c0vb Kiv nte|

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

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

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

thgb G†Z \_vK†Z cv†i –

- wbtqvM cwi Kí bv
- vb/mvæavw`i eY0v
- w†kl DcKiY/hšçwZi Zvuj Kv
- c0ZthvM" e`i Zvuj Kv
- mnthvMxZvgj-K Kv†Ri eY0v
- Gj vKwfvE K RbM†Yi m=ú"3 Zv
- j ¶" `†j i Kv†Q tc0v†bvi tKŠkj |

### **ev`évb†hvm` KvhRj vc**

j ¶" `†j i mv†\_ thvM†hvm` vcb Kiv mn Zv†`i mv†\_ msthvM i ¶vi gva†g 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\_` mub†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 c0v†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 QK**

eYbvgj-K cKvii gta` DfIk` ev`evqtb cwi Kibv Ges tKvb GKiu mekl AwzK Aej ab Kti KvtRi carb KviY ev rationale eYb Kiv carb` ciq| tKvb aitYi KivR Kiv nte Ges wKfite G,tjv Kiv nte ZviB eYb \_vK GB Qtk|

**maviYZ GtZ vbtas Askmgv \_vK -**

fvgKv, vb/mvavi vbePb, Kgvvbtqvm cwi Kibv, DcKiY ev nviZqvi vbgP, mekl DcKiYi eYb, mnthvMZvgj-K KvtRi eYb, Kgyvul ev AvAj K m`u,Zv, mvi vsk, BZ`w |

**ifctiLvvgj-K QK**

GB cxvZtZ KvhRj vcmgnK GKiu mekl j`I DfItk`i mvt\_ m`uKZ Kiv nq| wK Kiv ntqtQ Ges cL`vkv wK wQj GB `tqi gta` myuo m`uKcok Kiv nq GB Qtk|

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

GB aitYi Qtk ifctiLvi gZB KivR Kiv nq, Zte GLvrb gj`vqb cwi Kibv| mnthvMZv nq|

**mgqmvvgj-K ev Time Line QK**

A\_`mrvh`Kvix ms`v MtelYv KivRvUv mgqmv m`u Jrmk` cKvk KitZ cvti GB w`tkj`I titL GB Qtk cZvU `fii vbw` mgvqi Dtl \_vK|

gtb ivLteb, cZvU tctcivRvtj Organizational Structure Ges Starting plan ev Kgv vbtqvMi cwi Kibv \_vKte| maviYZ G,tjv cwi wko Astk \_vK|

Avgiv GB cvtV t`Ljvg cR± IqvKmtU tKvb Ask,tjv \_vK Ges cieZqZ GB mg`Askmgvni msvvB eYb| tcjvg GB cvtV|



**cvtVvEi gj`vqb - 4**

**• msvvB DEi ckae**

1. cR±i IqvKmtU wK aitbi eYb \_vKtj GKRb MtelK vbw`sgtb KivR KitZ cvtib?
2. cY% cR± KvhRj vtc tKvb velq mibvewZ \_vKte?

ḡ Ae GWKkb

### Dḡk

GB cV tkḡ Avcb—

- ◆ D`niY Dc`vcbeR MtelYv cORḡi cKwZ e`vL`v KiḡZ criḡeb|

GB criV Avgiv evsj v GKvḡWgx I GukqWUK tmvmvBwU Ae evsj vḡ`k KZR cwiPwj Z  
 `BwU MtelYv cORḡi ifcḡiLv ḡ`Le| `iagvḡ ḡ`kxq D`niY Dc`vcḡbi Dḡiḡk` GB  
 D`niY `BwU GLvḡb Zḡj aiv nḡqḡQ| mḡvúúZK KivR eḡj Gi gḡa` me`ḡjv Dcivḡb  
 LḡR cvl qv mḡe nḡe|

### D`niY 1

evsj v GKvḡWgx eml R mvariY mfv (1998) Gi KivḡeeiYx cV Kiḡj Avgiv ḡ`LḡZ  
 cvB th,

eml R Dbqb Kivḡḡḡg (1997-98) GKvḡWgx evsj vḡ`ḡki gḡḡḡḡx i BwZnm MḡS` cḡqb  
 I cKvḡk mḡvúúGKwU cKḡi MḡY Kḡi|

### G cKḡi i jḡḡ` vK vḡj?

ŌevŌvj Rvḡzi BwZnvḡm G hveZKvḡj i meḡkḡ NUbv gnvb gḡḡḡḡx i ḡRj vḡvḡEK  
 ZYgḡ` chḡq ḡ`ḡK mḡMḡxZe` mgḡ e`ḡbḡ BwZnm iPbvi Dḡiḡk` gḡḡḡḡx i BwZnm  
 vḡlqK 64wU MḡS` Ges ḡbS-Kgḡḡḡv, vḡgvb evḡnbx, ḡmbvevḡnbx I vKḡkviḡ` i gḡḡḡḡx i  
 Ae`vb mḡvúúKZ 4wU MḡS` Ges evŌvj Rvḡzi Avemseḡv Z ḡbZv Rvḡzi RbK eḡeḡZ  
 ḡkL gḡRej ingvḡbi Rḡḡbi Dci HwZnvḡmK `iḡZcḡAvḡj vKvḡḡi 1wU Avḡj evg G  
 cKḡi i Aaxḡb cKvḡk Kivi jḡḡḡ` vbaḡY Kiv nq|Ō

### cḡḡeZ cḡḡḡj Z e`q KZ vḡj?

meḡḡw 163.00 j ḡḡ UvKv|

### cKḡi i ḡḡḡ`?

Rvbgvix 1997 nḡZ `iḡ2002|

Avgiv Dcḡii D`niYwḡZ ḡ`LḡZ cḡḡḡj ḡḡḡ, cḡḡeZ cḡḡḡj Z e`q I cKḡi i ḡḡḡ`  
 mḡḡḡ GḡZ mḡvúú BwZ iḡqḡQ|

### D`niY 2

GukqWUK tmvmvBwU Ae evsj vḡ`k ŌŌGbmḡBḡKvḡcḡWqv Ae evsj vḡ`kḡḡ bvgK GKwU  
 cORḡ MḡY KḡiḡQ| G mḡḡḡ KḡqKwU gḡ- Z` vbgḡc -

cORḡi vKḡi vbg: Encyclopedia of Bangladesh.

gḡ- Drcḡv` Z e`ḡ: evsj v vḡcḡWqv

gḡ- cwiPj bv mḡḡ: GukqWUK tmvmvBwU Ae evsj vḡ`k

cYWKiv: -----

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

cOR± cwi Pij K Ges c`vb m`uv` K: -----

gva`g: gY Ges CD-ROM

fiv: eisj v Ges Bst`i Rx

AvKvi Ges gva`g: -----

m`te` GwU`msL`v: 25000

j`j` : MtelK, tckvRme, uk`K, uk`v`p, mi Kvi x Ges temi Kvi x ms`v, mef` kx  
ugkb, em: eisj v` kx, `vY Gkxq ÷ vW tK` Ges mavi Y cvK |

c`ij Z e`q: -----

cZ`vkZ Dm: -----

GikqviUK tmvviBvJi GB cOR± w`tcvU(1998) eYvj-K e`L`v tKskj (cvV 4  
`be) Aej`b Kti c`ugK t`cvRij Dc`vcb Kti`Q | GtZ th mg`Ask i`q`Q  
Zv n`Q-

- msAv I D`i`k`
- j`j` I e`envi thvM`Zv
- cOR± CxWZ (Project Methodology)
- tj LK `Z; Ges DrKI`Zv vqS`Y
- cOR± Kv`Ri AMWZ
- `uYi KZ .msMv
- A\_`c`B
- e`e`vcbv
- Abv`
- c`k`Y
- Kg`j I Kg`cwi K`i`bv
- e`emvqK cwi K`i`bv
- DcKvi
- fivel`r DrKI`Zvi cwi K`i`bv |

Dcti i`Bv D`vniY ch`j vPbv Kivi ci cOR± t`cvRij Gi Mv m`fU Avcbv` i  
v`q`Q avi Yv n`q`Q | eStZ tcti`Qb th, MtelK ev MtelK `j vBR`^Pv`v, A\_`



ḡ Ae GWKkb

mrvh"Kvix ms̄vi cḡqvRbxqZv Abv̄v̄i th tKvb Rbucḡ M̄elYv ḡW̄t̄j i w̄KQy  
c̄v̄ieZḡ K̄ti w̄bR̄^GKw̄V Kvh̄R̄i M̄elYv ḡW̄t̄j ḡZ̄v̄i K̄ti w̄b̄Z c̄v̄t̄i b̄|



## c̄v̄t̄V̄Ēi ḡj̄v̄q̄b- 5

- m̄s̄w̄j̄B D̄Ēi c̄k̄æ

1. cḡR± tcḡc̄v̄R̄v̄t̄j i īf̄c̄t̄i L̄vi ḡt̄ā" tKvb , īæZ̄c̄ȲAsk , t̄j v̄\_ v̄t̄K?
2. Ḡv̄k̄q̄v̄i UK t̄m̄v̄v̄B̄iLi th cḡR±w̄V eZḡv̄b c̄v̄t̄V D̄v̄ni Ȳ w̄t̄m̄t̄e Dc̄v̄cb Kiv n̄t̄"Q  
Z̄v̄t̄Z ḡḡf̄v̄el̄r DrKl̄Z̄vi c̄v̄i K̄i b̄v̄ḡḡ b̄v̄t̄g GKw̄V Ask īt̄q̄t̄Q| GB Āt̄ki  
cḡqvRbxqZv ēv̄L̄v̄ Kīæb̄|

## Z\_`tidv`iW`ys tKŠkj

### Df`ik`

GB civ tkfI Avcb —

- ◆ MtelYv KvRi Rb` gva`wgK Z\_` msM`ni Dm mbr<sup>3</sup> KiZ cvi`eb;
- ◆ MtelYv KvR e`euZ Z\_` Dc`vcb cxwZ eY`v KiZ cvi`eb Ges
- ◆ `xKZ.tidv`iW`ys tKŠkj c`qM KiZ cvi`eb|

MtelKtK th tKvb MtelYv KvRi vbhŷ nevi c`g c`tŷc nj tKvb c`ŷj Z ZÉ; e`e`v, cxwZ, tKŠktj i gta` tKvb mxgve`Zv, Am`úY`Zv AvtQ wKbv Zv mbr<sup>3</sup> Kiv| mZivis th tKvb MtelK MtelYvi c`wgK chŷq `xKZ.Rvbŷ, eB, tiKW`v`ij j LtR tei Ktib th mgm`vU vbtq wZvb KvR KiZ AvM`x tm m`útk`ev Gi m½ m`úwKZ tKvb mgm`v vbtq ce`Z`mg`q tKvb MtelYv ntq`Q wKbv, ntq`vKtj Zvi djvdj wK| GB mg`l c`qRb AvtQ etj Avgiv Rvb, MtelYv KvR gva`wgK Zt`i e`envi I euj c`ŷj Z| Gme wewfbæKvi`Y GKRb MtelKtK RvbZ nq wZvb Zt`i mÚv`b wK ai`Yi Dr`mi KvQ hv`eb, 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 thš<sup>3</sup>KZv wPv`yZ Kivi ci wewfbætiKW`v`ij w`tcvU` Mfxi fite chŷj vPbv Ktib| GRt` Zv`K Zt`i Dr`mi c`KwZ. wbaŷY KiZ nq| thgb ōc`Bgvix wKŷw` mspv`š tKvb ce`Z` MtelYv KvR t`L`Z ntj MtelKtK gqgbv`mstni RvZiq c`wgK wKŷv GKv`Wgxi MŠvMv`i thZ nte| MtelYvi c`KwZ. I Df`ik` eY`v Kti GRb` wZvb ce`ŷYB mskw` c`Z`v`b c`v`b`i wBKU mivmvi ev MŠvMv`i tKi gva`tg t`c`i Z c`I ōv`v MŠvMv`i e`envi i Absv`Z MhY Kiteb|

evsj v`k weM`ZKvj x v`w`v MtelYv mspv`š Z\_` msM` KiZ ntj MtelK mvariYZ c`g`B BANSDOC, BANBEIS, wKŷK c`kŷY gnw`v`ij qmg`ni MŠvMv`i Ges XvKv wekŷe`ij tqi wKŷv I MtelYv Bw`v`UDt`Ui MŠvMv`i miv`v` MhY Kiteb| evsj v`k Dbŷ wekŷe`ij tq v`R`^tKvb MtelYv ag`D`Pzi chŷqi wKŷv t`c`w`g GLt`v Pvj yv ntj I Dbŷ wKl`b cxwZi Dci th mg`l MtelYv ntq`Q tm,`tj v`m`t`U wKQyZ\_` cvl qv hv`te evDv`ei MŠvMv`i |

miv`úZKkv`j th tKvb MtelK Kiv`úDv`i e`envi i ōv`v Bv`v`t`bU, www, eŷDv`Rs miv`v`i gva`tg c`w`exi th tKvb t`k ev c`Z`v`b nZ wR`^MtelYvi m½ m`úwKŷ Z\_` msM` KiZ cvi`eb| Gi Rb` MtelKtK Kiv`úDv`i e`envi i gva`tg Bv`v`t`bU miv`v`i e`envi KiZ nte| GB e`e`v LiP m`tc`ŷ Ges chŷŷ I Kiv`úDv`i w`f`P etj evsj v`k i wKŷv MtelYv t`ŷt` GwU GLt`v euj Rv`c`Zv AR` Kti bvB| mZivis, evsj v`k i eZ`v`b cvw`v`wZ`Z G Avtj vPbvq tKvb , i`z`c`ŷZ\_` cvl qv hv`te bv|

~ž Ae GWKKb

Avġiv Rmb th, gvV chġq wbtR gva'wgK Z\_ msMh KvR AskMhY Kivi cte<sup>©</sup>  
MtelKtK G m<sup>†</sup>U Dch<sup>ŷ</sup> cŏwZ MhY KiZ nq| tKvb MŠvMvi nZ tKvb cKwZi  
Z\_ msMh Kiv m<sup>†</sup>e tm m<sup>†</sup>U GKwU cŏwK avi Yv msMh Kti cwi Kí bvi Abġvqx KvR  
KiZ nte| bZev A\_<sup>©</sup> mgq Dftqib AcPq nZ cŷi; GB AcPq Averí gġ-  
cwi Kí bvi Dci tbwZevPK cŷve ivLte|

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

- mgm'vi wKueZ<sup>©</sup> ev mgag<sup>©</sup> Ab'vb mgm'v Ab' tKvb MtelK wK Avwztk wtkdY KtiQb Zv Rvbr m<sup>†</sup>e|
- mgm'wM' wcl qe'í AZxZ BwZnm msMh KiZ mnvh Kti|
- tKvb cŏqvRbxq gva'wgK Z\_ msMh Kiv m<sup>†</sup>e|
- MtelYvi thŠw<sup>©</sup>KZv, Dŷik, Z\_ msMhKvix hšMvcthvMx, mwK, Kvhrí Z\_ msMh KiZ mg\_ qŷtqŷb wKbv Zv RvbtZ mnvh Kti|

**WKtU wtkdŷi gva'ŷg msikó mgm'wli AbġwubKZ Z\_ msMh Kiv m<sup>†</sup>e|**

WKtU wtkdŷi mġev mgr wbgŷc –

- msMpxZ Z\_ wMZKvj xb Zŷ'í mZ'Zv cŏZwZ Kti|
- cKġvj v, mvŷvRkvi BZ'w' tKŠktj i gva'ŷg msMpxZ Z\_ Aŷcŷv G aitbi Z\_ AwakZi wklmthvM nZ cŷi|
- WKtU msŷŷB Ges Gi mnR e'envi vcthvMxZv iŷtqŷ|
- Z\_ cŏqM thvM Ae'vq cvl qv m<sup>†</sup>e|
- Z\_ AZ'šíAí A\_<sup>©</sup>ŷq msMh Kiv m<sup>†</sup>e|

MtelK Zvi MtelYv m<sup>†</sup>úK<sup>©</sup> w\_mxm ev wŷcŷU<sup>©</sup>wKfute e'ewZ Zŷ'í Dm Dtj - L Kiŷeb?

Z\_ cÄx wġ wce<sup>x</sup> Kivi AvšRwZK wKQybqg AvŷQ| gġ-Z`Bw tKŠkj ev cŏqv eŷ e'ewZ|

GKwU cŏqvq cŷvi th'vŷb Z\_w e'ewZ nŷtqŷ wK tmLvŷbB tidvŷí wġ wce<sup>x</sup> Kiv nq, thgb –

**cŏg tKŠkj**

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



**cW 7**

**MtelYv m` f©KwVtgv I cÖZKiY**

**Dfík**

GB cW tkfI Avcb —

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

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

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

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

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

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

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

**D`niY**

Avgiv KtqKtU nekje`ij tqi ucGBPwW MtelYvi wbgvej x t`K `B GKtU Ask t`Le|

fritzi gnivRv mqvRxivl nekje`ij q (etiv`v) Gi ucGBPwW ti ,tj ktb wbaifc DtjL itqtQ –

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

[g]- e<sup>3</sup>e: tevW<sup>©</sup>Ae ÷wWR nelqe` wbaifY Ktib, ucwR KvDwYj cQqRbxq Abtgv`b c0vb Kti| c0Z`K c0`K Pvi Kuc UvBc Kiv w\_mmm Rgv w`tZ nte| w\_mxtm Mtel Yv KvRi eYBv \_vKte| MtelK bZb wK mZ` ev tKSkj Awe<sup>®</sup>vi KtiQtB Zv wj wce<sup>x</sup> Kiteb|]

Avtgvv Kvi nvl qvB ivtR`i Pacific Western University Gi mæZtKiEi chitqi w\_mxm I c0R± mæfU wbaifc wbt`R itqtQ –

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

At`ij qvi KvjUB BDubfvmmB Ae tUKtbij wR Gi doctoral wvwmB wbgvej xtZ referencng mæfU wbgæfc DtjL itqtQ –

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

Gi Kg wKQyætkl wbgq mg<sup>x</sup> bmmZgvj v me nekje`ij tqi AvtQ|

**wj Lb ÷vBj**

w\_mxm wj Lvi mgq th ÷vBj mvavi YZ Abvri Y Kiv nq Zvnj The Chicago Manual of Style, GBtU wKkvMv nekje`ij q KZR.c0Z eQi cKvk Kiv nq|

c0ZwU c0Zw0Z nekje`ij q, D`P wK`v c0Z0vb Ges MtelYv ms`v AvSRwZK wbggbwzi m`½ wR`^wKQywbq msh` Kti MtelYv KivR ev w\_mxm c0qb msvš GKtU AvSRwZK fite` wKZ.bmmZgvj v e`envi Kti|



**cvtVæi gj`vqb- 7**

- msvB Dæi cæ

1. MtelYv m` f`mvavi YZ tKvb Ask ,tj v `tK?
2. MtelYv m` f`vj Lb ÷vBj , iæZc`Kb?



**cW 1**

**msfk**

**Dfik**

GB cW tkfI Avcib —

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

uk<sup>9</sup> e`e`vi weifbaet<sup>9</sup> Avgiv mevB weifbaew`K ubtq KvR KiuQ| Avcbriv tKD tkYxK<sup>9</sup> uk<sup>9</sup> ubtq<sup>9</sup>RZ, tKD uk<sup>9</sup> c0vmtb KvR KiZQb| tKD Avevi uk<sup>9</sup> I civ`m<sup>9</sup> uba<sup>9</sup>Yi`vqZc0B, tKD ev cix<sup>9</sup> Pij bv, civ`cyK c0vkbv I gy<sup>9</sup>Yi KvtR e`l i tq<sup>9</sup>Qb| uK<sup>9</sup> G mg`l tckvq ubtq<sup>9</sup>RZ c0Z`KtKB c0qk`<sup>9</sup> Pj tKi gta` we`gvb m`utK<sup>9</sup> c0vZ. I gvIv ubY<sup>9</sup> KiZ nq|

thgb- c0<sup>9</sup>gK we`ij tqi uk<sup>9</sup> i`vqZi`v<sup>9</sup> uk<sup>9</sup> i eqtmi mvt` thb`<sup>9</sup> ev<sup>9</sup> nq tm<sup>9</sup> tK`<sup>9</sup> i vL| Gt<sup>9</sup> c0Zv tkYxi c0Zv uk<sup>9</sup> eqm evovi mvt` mvt` kvi ixK ev<sup>9</sup> I thb AvbgvZK nvti nq tm Rb` eqm I D`PZvi ga`Kvi m`uK<sup>9</sup> tei Kiv Z<sup>9</sup> i`vqZi|

Avevi uk<sup>9</sup> v<sup>9</sup> v<sup>9</sup> mlyg Lv` MhY KiZQ uk<sup>9</sup> ev GtZ Zvi`<sup>9</sup> ev<sup>9</sup> AvbgvZK nvti n<sup>9</sup> uk<sup>9</sup>, th uk<sup>9</sup> MvYtZ fuj tm weAvt<sup>9</sup> fuj uk<sup>9</sup>, th eisjv e`vKi<sup>9</sup>Y`<sup>9</sup> tm uK Bst<sup>9</sup>R e`vKi<sup>9</sup>YI`<sup>9</sup> G mg`l v<sup>9</sup> tK tLqv i vLb gva`gK ch<sup>9</sup>qi tkYx uk<sup>9</sup> Ges weI q uk<sup>9</sup>|

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

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

h<sup>9</sup> v<sup>9</sup> Pj K Gifc nq th GKvU gvb cwieZ<sup>9</sup> Ab`vU gvb cwieZ<sup>9</sup> nq (evto ev Ktg) Zte GB`<sup>9</sup> Pj KtK ci`ui m`uK<sup>9</sup> ev correlated ej v nq|

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



~ç Ae GwZKkb

Geri Avgiv GKU msAv t`uL –

“When there is a relationship of quantitative nature between two sets of phenomena, the appropriate statistical tool for discovering it in a precise way is known as correlation.”

A\_#; hiv` `BU Nubv ev cçtAi gta` tKvb cwi givMZ mæúK@\_v#K Zte th cwi msvuL`K DcKi#Yi mrvv#h` G#`i ga`Kvi mæúK@n#me K#i t`Lv nq Zv#K ejv nq m#k#d |

GB th `BU ci`úi mæúK#y Pj#Ki K\_v ejv nj G#`i gta` mæúK@mavivYZ uZb cKv#i i n#Z cv#i | GKU Pj#Ki gvb evotZ\_vK#j

- Ab`u#i gvb e#x tçtZ cv#i
- Ab`u#i gvb nvm tçtZ cv#i
- a#e\_vK#Z cv#i |

eqm evovi mv#\_ D`PZv evto uKŠ` GKU me#kl eq#mi ci uKŠ` Avgv#`i D`PZv Av#i e#x cv#e bv| m#Ziv#s, eq#mi mv#\_ uK#v#\_#i ``uK D`PZv e#x i mæúK#ei Ki#Z n#j Avgv#`i mavivYZ Ab#y#18 erm#i i uK#v#\_#`j M#y Ki#Z n#e|

t`Lv hv#`Q, `BU Pj K ci`úi mæúK#y uKbv Zv Av#M t`#K me#Pbv K#i w`i K#i u#Z nq| c#B eq`#`i eqm e#x i m#Z ``uK D`PZv e#x n#e bv| ``b#`b R#e#b Gi Kg e# Pj K msM#h Kiv m#e hv#`i gta` cvi`úi K mæúK#i#q#Q uKsev cvi`úi K tKvb mæúK#bB|

uK#v#\_ M#e#K, uK#v#\_ c#vmK, t#y#K#v uK#v#\_ mK#jB c#qvR#e#v#ta cvi`úi K mæúK#y `BU Pj#Ki ga`Kvi mæúK@n#me K#i tei Ki#Z cv#i b|

Avgiv cieZ# cv#\_#j#Z Kvj#`icqvim#bi product moment coefficient of correlation (r) Ges Spearman’s rank correlation coefficient (ρ) e`envi Kiv uKLe|



## cv#v#Ei gj`vqb - 1

- ms#v#B D#Ei c#æ
1. m#k-#l i msAv c#vb Ki#b|
  2. tKvb ai#bi `BU mæúK#y Pj#Ki gta` m#k#d n#me Kiv D#PZ?
  3. mæúK#y Pj#Ki GKU#i cwi eZ#b Ab`u#i uK ai#bi cwi eZ# n#Z cv#i?

**msfk- I v¼**

**Dfik**

GB civ tkfI Avciub —

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

Avgiv cŭg cvtV tRþbW mskd wK Ges tKvb aiþbi PjþKi gta` mskd \_vKvi mætebv AvtQ Zv cvtVi tkfI mbr³ KiþZ mŕŕg ntqiuQ|

eZgub cvtV Avgiv `Bw mæúKŕy PjþKi ga`Kvi mæúKŕ gŕv tei Kie|

th cwimsL`vbMZ parameter, mPK ev ciwguZi mrvth` `Bw mæúKŕy PjþKi ga`Kvi mæúKŕ tei Kiv nq ZvþK etj mskdv¼ ev ,Yv¼ ev coefficient of correlation (r)|

Avgiv hw` mskdþK ewj 00` Bw ci`úi mæúKŕy PjþKi gta` mnMgþbi cEYZvŭ Zintj Avgiv mnþRB eþZ civuQ th GB mnMgb tgvUvgn wZb aiþbi ntZ cvti

- GKwJi ewx i mvt\_ AciuJi ewx A\_ev GKwJi nrtmi mvt\_ AciuJi I nwm
- GKwJ ewx i mvt\_ AciuJi nwm
- GKwJi ewx ev nrtmi mvt\_ Ab`uJi tKvb evn`K mæúKŕv \_vKv|

Dctii wZb cKvtii gta` cŭguþK ejv nte avvZþK mskd | wZxquW nte FYvZþK Ges ZZxq tŕŕt` tKvb mæúKŕvB, A\_ŕ r = 0|

`Bw mæúKŕy PjþKi Dftqi cwieZB mggŕx (GKwJi ewxþZ AciuJi ewx, GKwJi nwm ntj Ab`uJi I nwm cvl qv) ntj r avvZþK nte| Gi mtePP gŕv nte + 1|

thgb- mæúZ CAMPE (Campaign for Popular Education) GK MfelYv cKvkbvi (Education Watch 1999) gva`tg RvnbþtQ th, AmgeavMŭ` cwi evti cŭwgK wKŕv we`ti wZvgnZvi AskMhY, weþkl Kti gvtq` i fvgKv AZ`šimvqK|

A\_ŕ Avgiv ejþZ cwii, cŭwgK wKŕv wKŕv\_ŕibeÜb msL`v ewx i mvt\_ mšftbi gvtqi avvZþK AskMhþYi mæúKŕ mggŕx I D`PMgx (r avvZþK) | [Drm: The Daily Star 26þk AvM ÷ 099 ct, 1 I 11]



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 b# 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 `BwU cvfV Avgiv mstkd m=ŧÜ cġwgK avi Yv jvf Kiv mn mstkdv¼i newfbzv cġ"ŧ KtiwQ|

GB cvfV Avgiv mstkdv¼i , iaZ; tRtb mstK- Iv¼ vbYqi KtqKw mF cġqvm Kiv wkLe|

ev`é Rxe tb newfbetckvq wbtqmwRZ e"ir<sup>3</sup> Ggb Ae`vi m=ŧvb nb hLb Zvfk `B ev ZtZmaK Pj tki cvi`úwi K m=úK<sup>q</sup>fei KitZ nq|

wkŧv e`e`vq wbtqmwRZ newfbæ"ir<sup>3</sup>eŧM<sup>p</sup> newfbæaitbi djvdtj i KvhRvi Y wePvi Kivi Rb" mstkdv¼ wntme KitZ nq|

ev`éŧŧŧ mstkdv¼ wntme Kivi cġqvRbxqZv Ab`xKvh<sup>q</sup> D`vniY`ŧfc ejv hvq, 1999 mvj i AvM÷ gvŧm Letii KvMŧR t`Lv tMj Kŧmvfv AĀtj kwiš i ŧvi Rb" RmZmsN th kwišéwvbx tgvZvtqb KtiwQj tmLv tb evsjv`k cvj k evvnbx t`tk tgvU EbcĀvk Rb cvj k Avdmvi cvVvfv ntqwQj | GB kwišwgtb hvevi AŧM Zviv t`tk BstiwR fvvi`ŧZv wettq cixŧv w`tq DĒXY<sup>q</sup>ntqwtj b| wKš`ŧLRbK ntj I mZ" th, Kŧmvfv AĀtj tċŧQ Zviv Avevi hLb cixŧv w`tj b ZLb Zv`i gŧa" Qwŧ k RbB DĒXY<sup>q</sup>ntZ cvi tjb bv|

Avgiv ejtZ cwi GB`BwU cixŧvi djvdtj i gŧa" mgZv tbB etj B GB Qwŧ kRbŧK e`\_gŧbvi\_ ntq t`tk wdti AvmŧZ nj | [Drm: The Daily Star m=úv`Kix 14 AvM÷ 099] A\_ŧ th me e"ir<sup>3</sup> t`tk cixŧvq fvj dj KtiwQj b Zviv mevB Kŧmvfv wMŧq GKB cġwzi cixŧvq fvj KitZ cvi b bvB| Avgiv ejtZ cwi bv th evsjv`tki cixŧvq fvj Kitj B Kŧmvfv cixŧvq| fvj Kiv m=ŧ ntqwQj |

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

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

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

WK GKBfite ej v hvq,

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

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

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

- WRGbw ewx i mt`2 cwb eQti i Kgeqmx wki gZzi nvi FYvZK
- WRGbw ewx i mvt\_ cAg tkYx chS tclvrbv wki t`i kZKiv nvi avvZK|

Dcti i KtqKW D`vni Y t`tk Avgiv eStZ cvijvg RbRxe`bi tPtq m`uK` `Bw Pjtki gta` m`uK` L`R tei Kivi ht\_0 c0qvRb itqtQ|

g`b ivL tZ nte -

**mvgie`xZv**

- `Bw m`uK` Pjtki gta` mstk`l cwi jw`jZ ntj B wbw0Z ntq ej v hvtebv th, Gt`i gta` mwZ`Kvi At\_ m`uK` itqtQ|
- mstk`lv`4 we`kd Y Kivi dtj Avgiv i`agvT GB `Bw Pjtki ga`Kvi mnMgb m`uK` ari Yv cvB WKS` cwi eZ`bi tKvb Kvi Y m`uK` Z`\_ cvB bv|

Ge GWKkb

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

Gevi Avgiv wby® cxwZ wkLe|

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

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

**D`niY**

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

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

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

$\sum XY$

$\sum X^2$

$\sum Y^2$

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

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

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

Geri netμZv mŕĭ gvb\_ tĵv emtq r tei Kiab|

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

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

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

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

netμZv t`Lĵ b th eB `Bŕiŕi neŕŕi msL`vi gta` GKŕŬ ĞŕY abvZŔK m`uKŕġġtqŦQ|  
A\_ŕ eB netμZv GKŕŬ mvavi Y ũm`xġŕŕġAvmŦZ cvġi b th -

`BŕŬ eB-Gi tĵ LKB tμZv mvaviŦYi KvŦQ hŕ` RbŕcŦ ntq ZŦe `BŕŦbi RbŕcŦZvi  
gta` Lŕġ Aŕ gŕŕŕvq abvZŔK m`uKŕġġtqŦQ|

Avġiv Avġ GKŕŬ D`vni Y t`ŬL -

gŦb Kŕi tKvb GKŕŬ Gĵ vKvq tgvŬvġŬ GKb eqŦmi cvŕŬŬ ev`Pv eim KŦi | Zviv GKb  
mŕġ\_ tLĵ vajv KŦi; tKvb GKŕb ũkġi ũPŕKŕmK tei KiŦZ PvbŦĵ b GB cvŕŬŬ ũkġi  
D`PZvi mŕġ\_ IRŦbi m`uKŕġġK cKŕŬZi | ũZŕb GŦ`i D`PZv I IRb gvctĵ b Ges  
ũbŕŕŦc GKŕŬ PŕŬŕZvi KiŦĵ b|

ũkġi	D`PZv	IRb
K	31	17
L	27	18
M	29	16
N	31	22
O	32	22
	<b>30</b>	<b>19</b>



Geometriya

Giriş

Giriş

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

Giriş

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

Giriş

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

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

Giriş



### cvfVvEi gj`iqb- 3

• **mgm`vgj-K ckae**

1. mstkdv¼ r wntme Kivi gva`tg mn-mauKfjy `Bw Pj tKi wK aiþbi mauK`fei Kiv mae?
2. `kg tkYxi gwmK cixflvq wbtgwe³ `kRb meflcflv `gfl wKflv`PmWYZ I c`v`© weAvtb wbgie/c baf tctqtQ| Avrcwb t`Ltz AvMbx 00hvin MwYZ `gfl Zviv mwaviYZ 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**

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

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

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

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

Avrcwb ati wbtz cvtib GB `kRb wKflv`PAsTK `gfl etj c`v`©weAvtb wcltql `gfl00 GB cca` tgvUvgnw mZ" (AsZ GB wefkl cixflvi tflfT)|

**civ 4**

**mwi ex mstkd v¼**

**Dfík**

GB civ tkfI Avcwb —

- ◆ mn-múKñ Pjtki MwyZK gvb e'envi e'wZtítK wK tkŠktj mstkd v¼ tei Kiv mæ Zv e'vL'v KitZ cvi teb|
- ◆ p ev mwi ex mstkd v¼ tei KitZ cvi teb Ges
- ◆ p Gi mxi ex Zv wPwýZ KitZ cvi teb|

wKñv tñtñ AfbK mgqB wKñKtK 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'í Pjtki miwmi gvb t' lqv mæ nt'Q bv, wKñK GB cKwzi `ñw múKñ Pjtki cvi `úwi K mútKp giv tei KitZ PvBtj mwi ex mstkd- l ev i'vsK-mú cxiZ cñqvM Kiteb|

Avgiv ejtZ cwii, 00th mg'í Pjtki mñw' ð mSL'wK Ae'vq cKvK Kiv hvq bv wKŠ' tkYx ev csw³ (ranking) Kiv mæ tm me tñtñ mwi ex mstkd v¼ (p) wñtme Kti tei KitZ nq|

**Kih ex wZ**

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

- Avcwb 1, 2, 3 BZ'w` AbywngK mSL'v e'envi Kti c`mgñi wñwÉµg ev rank w'í Kiab|
- `ñw múKñ Pjtki cñZ'KwU cf'i wñw' ð 'enkó'i mitctñ µg Abywqx `ñw Ae'vb civl qv hvte|
- Ppñšl chñq µg Abywqx Ae'vñbi `ñw tkYx cñZ Kiab|
- Gevi Spearman's rank correlation coefficient Gi mñ e'envi Kti Avcbvi wPwýZ PjK `ñwi gñ' Dcw'Z mæ' mútKp gvb (p) tei Kiab|

**p Gi mñ**

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

GLvfb,  $\rho =$  , YvbywngK mstkd v¼ (ev mwi ex)  
Gg GW tcnñg

N = MYmsL`v  
 d = cãZ tRvov µngK baf`i i gta` cv\_R`

Avmky, ev`é D`vni tYi mivvth` GB m`iU ejs tbB -

1998 uk`vve t`ei Dveõi `g Ae GW`Kkb Gi weGW t`õMõt g tKvb GKiu ÷vWV tm>Uv`i uk`v vbmZ cwi i PivZ I gtbveAvb cwi i PivZ tKvm`õ Bui iUDUi uk`v v`i GB tKvm`õB `Bui Kv`Ri mveavi Rb` GB `B iUDUi gv`I `kRb uk`v v`i tet`Q vbtj b| GKiu BDvb tUi Dci tg`Lk ck`õK itj b| c`i vZvb uk`v v`i i tevaMg`Zv`K vbgv`fc µngK baf`i v` t j b -

uk`v 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`Qb uk`v v`i, GB `Bui tKvm`õB-Gi `Bui avi Yv m`fU th e`vL`v v` t`Q Zvi gta` tKvb Av`õtm`õK`Av`Q vKbv|

ranking Kivi mgq GB `B iUDUi gv` t j vi Av`õm`K f`i i K\_v gtb i vL t j b| dtj G` i ranking mvi YmU vbt`Pi gZ nte|

t`i vls t`j		i`v`õKs t`j		d <sup>2</sup>
uk`v vbmZ	uk`v 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

Σd<sup>2</sup> = 102.50

$\bar{d}$  Ae GWKKb

$d^2$  Gi A\_ hj cŁZ tRvor μngK b̄ti i gta" ci\_ R" |

GLv̄b,  $\Sigma d^2 = 102.50$ ,  $N = 10$

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

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

$$= 0.379 = 0.38$$

Dc̄ti v̄ ̄ B̄u tKv̄m̄P̄ uDUi t̄ L̄tj b th, uk̄ŋv̄\_ŋ̄ i tevaMg"Zvi th i "vs̄uKs K̄ti t̄Q Zvi gta" t̄gvUvḡȳ GK abv̄Z̄K mn-m̄úK̄ŋ̄ t̄t̄Q |

huiv̄ uk̄ŋv̄ m̄úK̄ŋ̄ ŋelq ŋbt̄q t̄Qv̄U Lv̄U M̄tel Yv̄ Ki t̄Z Pvb Zuiv̄ GKUz̄t̄P̄on Ki t̄j B Gi Kg ĀtbK ŋelq cv̄teb thLv̄tb Pj t̄Ki gta" i "vs̄uKs m̄úK̄ŋ̄ mn-m̄úK̄ŋ̄ t̄ei K̄ti ŋet̄k- IY Kiv hv̄q |

**mgve×Zv**

Spearman's rank correlation  $\rho$  Gi uk̄Qym̄gve×Zvi t̄t̄Q | G\_ t̄j v̄ n̄t̄Q-

- i agv̄ŋ̄ t̄K̄Yve× ŋPj K c̄vi msL̄v̄ ŋeÁv̄t̄bi t̄ŋ̄ŋ̄  $\rho$  Gi gvb t̄ei Kiv m̄ē |
- c̄msL̄v̄ t̄ek̄ ev̄  $N > 30$  n̄t̄j  $\rho$  Gi gvb ŋbȲŋ̄ Kiv K̄om̄va" |

gtb iv̄L̄teb,

- $\rho$  Gi gvb  $h\bar{w}$  +1 nq ZLb ēŋS ŋbt̄Z n̄te th, ̄ B̄u cv̄kvc̄vk̄ m̄vi t̄Z μg Ab̄ŋv̄q̄x c̄ŁZ"K c̄t̄ i Aēv̄b GKB |
- $\rho$  Gi gvb  $h\bar{w}$  -1 nq ZLb ̄ B̄u m̄vi i μg Ab̄ŋv̄q̄x c̄ŁZ"K c̄t̄ i Aēv̄b ŋec̄iv̄Zḡȳ |
- $\rho$  ŋnt̄me K̄ti t̄ei Kiv t̄gvUvḡȳ mnR |
- , Yev̄PK Z̄t̄\_ i t̄ŋ̄ŋ̄ μg gv̄ŋ̄v̄ ēen̄vi K̄ti m̄nt̄RB  $\rho$  Gi gvb t̄ei Kiv hv̄q |
- Z̄\_ μgv̄b̄ŋv̄q̄x m̄vi ē× Aēv̄q̄ cv̄l̄qv̄ t̄M̄t̄j GKgv̄ŋ̄ Spearman's rank correlation Gi gvāt̄g m̄stk̄d̄ v̄¼ t̄ei Kiv m̄ē |



### ciVvEi gj`vqb - 4

• msuB DEi ckae

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

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

3. tKvb GKvU cvevj K cixvqv BstivR I eivsv mel tq 100 bafii `be<sup>3</sup>K cixvqv 12 Rb cixvqv\_ p`btg<sup>3</sup> baf tctqtQ| kvqv\_ i GB `BvU mel tqi bafii ρ tei Kiab|

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

### 3. mgvab

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

X baf	Y baf	X Ae`vb	Y Ae`vb	d = X <sub>A</sub> - Y <sub>A</sub>	d <sup>2</sup>
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**

**ciVgwiĶ I AcivgwiĶ cwiMSL`vb : aviYv**

**DfĶk`**

GB ciV tkĶI Avciwb —

- ◆ ciVgwiĶ tU÷ msÁvqZ KiĶZ cviĶeb;
- ◆ AcivgwiĶ tU÷ msÁvqZ KiĶZ cviĶeb;
- ◆ `B cĶvi tU÷ i cv`R` ubĶ`R KiĶZ cviĶeb Ges
- ◆ ciVgwiĶ tU÷ i `enkó` wPwYZ KiĶZ cviĶeb|

wĶŋv tŋĶĶ ubĶqwiRZ MteĶKĶ` i ciVgwiĶ I AcivgwiĶ Dfq cĶĶĶi cwiMSL`vĶbi hĶ\_ó e`envi KiĶZ nq| GB ciV Avgiv GB `B cĶĶĶi cwiMSL`vb e`envi msµvšI wĶQyAvĶj vPbv Kie|

ciVgwiĶ tU÷ nj tm aiĶbi tU÷ thLvĶb MteĶK th Z`wek! ev mgMĶ nĶZ bgĶv Pqb KĶib Zvi gĶa` G,Ķjvi c`viwvUvi ev gvĶv mĶĶŰ wĶQymĶw`Ű kZ`vĶK| G mg`ĶtgŶj K kZ`hLb cĶY Kiv mĶe nq i agvĶ ZLbB MteĶK G aiĶbi tU÷ e`envi KiĶZ cviĶib|

A\_ŋ ōōth aiĶbi tU÷ Z`wek! ev mgMĶ Gi parameter ev gvĶv ev gvĶ mĶĶŰ wĶQy mĶw`Ű kZ`vĶK ZvĶ` i ciVgwiĶ tU÷ etj |ŌŌ

ciVgwiĶ tU÷ i D`vniY nj , t, z Ges F tests |

AcicĶŋ, AcivgwiĶ tU÷ nj tmme tU÷ hvĶZ th Z`wek! ev mgMĶ nĶZ bgĶv Pqb Kiv nq Zvi c`viwvUvi ev gvĶv mĶĶŰ tĶvb mĶw`Ű kZ`vĶK bv| G aiĶbi tU÷ e`UbgŶ ev distribution free|  $\chi^2$  ev KvBeMŋtU÷ nj AcivgwiĶ tU÷ i gĶa` eŰj e`eüZ GKw|

Avgiv cieZŋcW,Ķj vĶZ G mg`ĶtU÷ ubĶq we`vni Z AvĶj vPbv cie| Geri t`LŶ GB `B cĶĶĶi tU÷ i gj`cv`R`|

QK 5-5.1: *civgnwĭK* I *AcivgnwĭK* tU÷i *cv\_R`mgn*

<i>civgnwĭK</i>	<i>AcivgnwĭK</i>
<ul style="list-style-type: none"> <li>• <i>th</i> <i>wbtekb</i> <i>nřZ</i> <i>bgly</i> <i>msMh</i> <i>Kiv</i> <i>nq</i> <i>Zvi</i> <i>cKwZ</i>. <i>Rvbn</i> <i>_vKřZ</i> <i>nře</i>  </li> <li>• <i>mgMhKi</i> <i>gvĭv</i> <i>mřtU</i> <i>KZ</i> <i>_vj</i> <i>wřkl</i> <i>AbgnwZ</i> <i>ev</i> <i>assumption</i> <i>_vřK</i>  </li> <li>• <i>AcivgnwĭK</i> <i>tU÷i</i> <i>tPřq</i> <i>kw<sup>3</sup>kvj x</i>  </li> </ul>	<ul style="list-style-type: none"> <li>• <i>th</i> <i>Z_`iek</i>! <i>nřZ</i> <i>bgly</i> <i>msMh</i> <i>Kiv</i> <i>nq</i> <i>Zvi</i> <i>parameter</i> <i>ev</i> <i>gvĭv</i> <i>mřtU</i> <i>cKwZ</i> <i>mřbw</i> <i>ř</i> <i>kZ_`vřK</i> <i>bn</i>  </li> <li>• <i>AcivgnwĭK</i> <i>tU÷</i> <i>KZ</i> <i>_řjv</i> <i>AbgnwZi</i> <i>Dci</i> <i>wřřřkvj</i> <i>nřj</i>   <i>G</i> <i>_řjv</i> <i>civgnwĭK</i> <i>tU÷i</i> <i>gZ</i> <i>RwUj</i> <i>AbgnwZ</i> <i>bq</i>  </li> <li>• <i>e`envi</i> <i>Kiv</i> <i>mřarRbK</i>  </li> <li>• <i>tU÷</i> <i>cřqvřMi</i> <i>cwi</i> <i>va</i> <i>civgnwĭK</i> <i>tU÷i</i> <i>tPřq</i> <i>e`řcK</i>  </li> <li>• <i>MwYwZK</i> <i>wřmve</i> <i>civgnwĭK</i> <i>tU÷i</i> <i>tPřq</i> <i>mij</i>  </li> </ul>

*civgnwĭK* *tU÷* *e`envi* *KiřZ* *nřj* *bgly* *cKwZ* *wbgřc* *nřZ* *nře* –

- *`řaxb* *ev* *Abřcřj* *chřeřjY* |
- *chřeřjY* *\_řjv* *`řřwřkřvře* *ewUZ* *Z\_`* *wřk*! *nřZ* *msMh* *KiřZ* *nře* |
- *th* *me* *Z\_`iek*! *nřZ* *bgly* *msMh* *Kiv* *nře* *Ziř`* *i* *řř`vř* *GKB* *nřZ* *nře* |
- *Pj* *K* *\_řjv* *AbgnwZ* *wřřřk* *t`řj* *cKwK* *KiřZ* *nře* |

*civgnwĭK* *tU÷* *cřqvřM* *Kiv* *mře* *bn* *nřj* *wbtgř<sup>3</sup>* *třřřř* *AcivgnwĭK* *tU÷* *cřqvřM* *Kiv* *Přj* –

- *Pj* *K* *\_řjv* *bwřřřřřk* *cwi* *gřc* *msřřřřř* *msL`vq* *cKwKZ* *nřj* |
- *Pj* *K* *\_řjv* *řgřřřřřk* *cwi* *gřci* *wřřřřřř* *cKwKZ* *nřj* |

*GB* *cřřV* *Avřiv* *civgnwĭK* I *AcivgnwĭK* *tU÷* *mřtU* *cKwZ* *mvaviY* *aviYv* *jřř* *Kij* *vg* | *cieZř* *cvW* *\_řj* *vřZ* *GřK* *GřK* *z*, *t*, *F* *Ges*  $\chi^2$  *tU÷* *mřtU* *Avřj* *vPbn* *\_vKře* |



***cřřřřřřř* *gřřřřř* - 5**

- *msřřřřř* *Dřřř* *cřře*
- 1. *civgnwĭK* I *AcivgnwĭK* *tU÷i* *gřřř* *cřřv* *cv\_R`* *wK*?
- 2. *civgnwĭK* I *AcivgnwĭK* *Dřřq* *cřřvi* *tU÷i* *GKwU* *Kři* *D`vniY* *w`b* |
- 3. *civgnwĭK* *tU÷i* *`enkř`mgn* *Dřřř* *Ki* *ab* |



**ԸՄ 6**

**ԿՆԵ ԵՄԳՄԻ**

**ԸՄԻԿ**

ԳԵ ԸՄ ԻԿԻԼ ԱՆԿԵԼ —

- ◆ ԿՆԵ ԵՄԳՄԻ = ՄՏՎՄԿԶ ԿԻԶ ԸՆԻԵԵ;
- ◆ ԿՆԵ ԵՄԳՄԻ ÷ Ի ՄԻ ՄԶ ԼԶ ԸՆԻԵԵ ԳԵՏ
- ◆ ԿՆԵ ԵՄԳՄԻ = ԸՊՎԻՄԻ ԻՊԻ ԸՄԶ Լ ԿԻԶ ԸՆԻԵԵ |

ԱԸՆԳՄԻԿ ԻՄ ÷ ՄԶՎԻ ԳԻՏ ԿՆԵ ԵՄԳՄԻ, ԳՆԵ ՍԵՄԵ Ս-ԻՄ ÷, ԱԵՆԵԿ ԸՆԸՐՐ ԸՄՆԶԻՏ ՄՏԻԿԻ ՆԵՊԵ, ՄԳՄՎԵԵ ԻՄ ÷ ԵԶՆԻ ԸՄԶ ԼԻՄՄ | ԶԵ ԳԻՏ ԳԻՏ ԿՆԵ ԵՄԻ ԻՄ ÷ Ե ՄԵԻՊԻԳ ԵՄԿ Ե՛ԵՆԶ ՆԳ |

ԿՆԵ ԵՄԳՄԻ ÷ Ի ՄԻՄՄ ՆԵԳԵԸ —

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

ԳԼՎԵԵ,

- f<sub>o</sub> = ԸՊՎԵՊԶ ԵՆ ԸՊՆ ՆԱԵՄԼՎԻ ԵՆ observed frequency
- f<sub>e</sub> = ԸՆԻՄԿԶ ՆԱԵՄԼՎԻ ԵՆ expected frequency |

ԳԵՆԻ ԱՆԳՎԻ ՄԵԼ ԿՆԵ ԵՄԳՄԻ ÷ Ի Ե՛ՆՆԻ Ի՛ԼԵ | ԻՏ ԻՊԻ ՄԶՎԻ ՆԱԵՄԼՎԻ ԳԻ ԵՄԶՎԵ ԿՆԵ ԵՄԳՄԻ ÷ Ե՛ՆՆԻ ԿԻԵ ԶՆ ՆԻՐՈ —

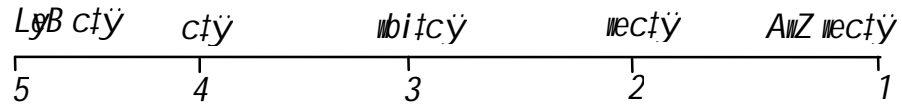
- մԳՆԵ ՄՆԵԵՆ ԸՆԻ (hypothesis)
- ԱԵԸՊ ԸՆԻ
- ՆԸԻԿՎԻԳՅԻ ԵՍԻՆԻ ՎԵՄԵԿ ԱՆԿՆԶ. ՄՍՆԿԶ ԸՆԻ |

**մԳՆԵ ՄՆԵԵՆ ԸՆԻ**

ԿՆԵ ԵՄԳՄԻ ÷ ՈՐՄԳՆԵ ՄՆԵԵՆ ԸՆԻ ԵՆ equal probability hypothesis ՈՐՄՄՄՄ ՆԿԵՆ ԶՆ ՆԱԵՄԼՎԻ ԿԻԻ | ԿՆԵ ԵՄԳՄԻ ԳՆԵ ՆԱԵՄԼՎԻ ԱՆՆ ՆԳ ԶԵ ԱԻ ՆԱԵՄԼՎԻ ՆԵՄԳՆԵ ՄՆԵԵՆ ԸՆԻ ԵՆՆԻՄՄՄ ԵՊ | ԱԸՆԸՊ ԿՆԵ ԵՄԳՄԻ ԳՆԵ ՆԱԵՄԼՎԻ ԱՆՆ ԵՆ ՆԳ ԶԵ ՄԳՆԵ ՄՆԵԵՆ ԸՆԻ ԵՆՆԻՄՄՄ ԵՄՄՄ ԵՄՄ ՄՈՂԶ ՆԵ |

**D`niY**

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



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

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

**Abtc`qv cE`A hvPvB**

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

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

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

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

**D`niY 1**

Aog tkYx cvk 150 Rb uk`qv`K 00veAvb00, 00emvYR`00 Ges 00Kj v00 vZbvU fvvtMi gta` tKvb fvMvU`Z Zvrv cotZ B`0K ckaE Kiv ntj Zvrv vbgv`c DEi Kij |

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

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

Gt`qv tKvb  $\chi^2$  tU ÷ e`envi Kti

00uk`qv`K`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) <sup>2</sup>	$\frac{(fo - fe)^2}{fe}$
weÁvb	35	50	- 15	225	4.5
ewYR`	55	50	5	25	0.5
Kj v	60	50	10	100	2.0
<b>ḡgW</b>					<b>7.0</b>

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

cZ`Á MhY ev eRḡ Kivi Rb` Geri GB cixḡḡYi `ḡaxbZv ḡvḡv tei Ki tZ 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 cvV` eB G  $\chi^2$  Gi  $\mu$ ḡḡḡv t`I qv `vḡK| th mg`I A\_ḡZvq GB ḡvḡv t`I qv `vḡK Zv nḡQ 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`  $\chi^2$  Gi  $\mu$ ḡḡḡv nj 5.99|

$\chi^2$  Gi cḡB ḡvḡ 7.00

$\mu$ ḡḡḡv ḡvḡ 5.99

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

thtnZzumišgvtbi tPtq cŮB gvb eo ZvB Avgiv ej e

Mäc cQþ`i e`vciþi iKŮv\_#`i th gZvgZ Avgiv t`Lj vg Zvi gta` A\_@n cv\_R`  
i tqtQ|



### **cv#VvEi gj`vqb - 6**

- **msmŮB DËi cŮæ**

1.  $\chi^2$  tUt÷i gva`tg tKvb aiþbi Z\_` cŮvk Kiv mæe?
2.  $\chi^2$  tUt÷i gvb hvi` A\_@n nq Zte mætebv cŮkí mæútkŮv aiþbi iimxvšíMpxZ nte?

**cW 7**

**z-tU÷**

**Df'ik**

GB cW tkfI Avciub—

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

aiab, GKB Z\_`iek! nTZ msMpxZ `BwU c\_zK bglv ġbtq Avciub Kvr KiTQb| Avcbri gtb ckeRvMtz cvi th, GB `BwU bglv ĠK GKB aiġbi? GKB aiġbi bglv 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 bglv 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 bglv `j ġbtq hLbB tKvb MtelK Kvr Ki teb ZLb ZvtK mġPZb 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 U÷|

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

z tU÷ e`envi i GKwU , iazcY`kZġtqtQ-

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

**z Gi mĤ**

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

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

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

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

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

SE<sub>D</sub> Gi gvb wbyqi cte<sup>o</sup>t`tL wbtZ nq `j `Bw UK aitbi | mraiv Y Avgiv wZb aitbi `j wbtq KvR Kwi-

- Abtc¶¶
- mgK¶¶
- mn-m<sup>u</sup>K¶¶

Avgiv GB cwtV iagv<sup>i</sup> Abtc¶¶ `Bw `tj i K<sub>v</sub> wePbv Kie |

$$Ab` `Bw t¶¶i iagv<sup>i</sup> SE<sub>D</sub> Gi m<sup>f</sup> cÜvb Kiv nt<sup>o</sup>, cÜqRbtefa Avcbviv Gi cÜqM KitZ cvi`eb |$$

Abtc¶¶ `Bw `tj i t¶¶i -

$$SE_D = \left[ \frac{S_1^2}{n_1} + \frac{S_2^2}{n_2} \right]^{\frac{1}{2}} \quad (m<sup>f</sup> 5-7.2)$$

GLvfb, S<sub>1</sub> = 1g bgbv `tj i Av`k¶¶PzZ

S<sub>2</sub> = 2q bgbv `tj i Av`k¶¶PzZ

n<sub>1</sub> = 1g bgbv `tj i AvKvi

n<sub>2</sub> = 2q bgbv `tj i AvKvi

**MwvZK D`viY**

Avgiv mevB Rmb h, `kLb c×wZ wbfP wkv¶¶v e`e`vq th mg`l tKvmeB gwZ nq ZvtZ evK` mnR A<sup>f</sup>evaK kã e`envi KitZ nq Ges evK`i `N<sup>o</sup>thb Lg eo bv nq tmw`k `wó w`tZ nq | Avgiv GB mZ`Zv wbtq GKwU cix¶¶Y Kie |

aiab, Avgiv Gwqvvi tKvb GKwU Dvgj wekte`ij tqi wkv¶¶v tcm<sup>o</sup>tgi tKvmeBmgfni ga` ntZ 40wU weAvb wkv¶¶Y m<sup>u</sup>xq l 40wU gvbweK wv q wkv¶¶Y m<sup>u</sup>xq tKvmeB tetQ wbjvg | GtZ th me evK` itqtQ tm<sup>u</sup>tjvi ÚÚMo kã msL`v vó tei Kijvg | msL`v<sub>u</sub> tjv wbgv<sup>o</sup>c:

	Mo kã msL`v	Av`k¶¶PzZ
wvAvb	18	2.2
gvbweK	17	1.7

thtnZzbgvvi AvKvi 30 Gi tPtq eo ZvB z tU÷ cÜqM Kiv Ptj |

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

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

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

ḡ Ae GWKkb

cḡtg SE<sub>D</sub> 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 ḡḡḡve Kiv mḡe/

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

z-Gi Av`kḡḡvi Yx nḡZ t`Lv ḡḡḡe cḡḡ ḡḡḡ (2.27) 1% ḡḡḡḡḡ A\_ḡn/

mḡḡḡḡ ḡḡḡḡḡ I ḡḡḡḡḡḡ Mḡḡci eB\_ḡḡḡḡ kḡ msL`vi ḡḡḡ A\_ḡn cv\_ḡḡ iḡḡḡḡ/



### cḡḡḡḡḡ ḡḡḡḡḡ- 7

• mḡḡḡḡḡ Dḡḡi cḡḡe

1. Mḡḡḡḡḡ mḡḡḡḡḡ: ḡḡḡḡḡ mḡḡ YḡZ GKB eqḡḡi 50 Rb evj K I 50 Rb evḡḡ Kvi Mo D`PZv I Av`kḡḡḡḡḡ Dḡḡḡ Kiv nj | evj K I evḡḡ Kḡḡ`i Mo D`PZvi ḡḡḡ t`Kvb A\_ḡn cv\_ḡḡ Avḡḡ ḡḡḡḡ Zv ḡḡḡḡḡ Kḡḡḡ/

	D`PZv (ḡḡḡḡ)	Av`kḡḡḡḡḡ
evj K	152.8	6.3
evḡḡ Kv	150.2	6.6

- z -Uḡḡḡ i cḡḡḡḡḡḡ cḡḡḡḡḡḡ kZḡḡi cḡḡ tLqj ivLḡZ nḡe?
- z -ḡUḡḡ KLB Ges ḡḡ cḡḡḡḡḡḡ tḡḡḡḡ e`ḡḡḡḡ Kiv nḡ?
- z -ḡUḡḡ e`ḡḡḡḡḡḡḡ Gḡḡḡḡḡḡḡḡḡḡḡ Zv Dḡḡḡḡ Kḡḡḡ/

**cW 8**

t-tU÷

**Dt`ik`**

GB cW tk`l Av`cwb—

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

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

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

t-tU÷ i m`f`w`w w`b`g`e`f`c —

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

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

- mn-m`u`K`h`y
- Ab`tc`q`l
- mg`K`q`l

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

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



ḡ Ae GWKkb

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

Abtcḡ ḡ Gi tḡḡ SE<sub>D</sub> nte –

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

mgKḡ ḡ Gi tḡḡ SE<sub>D</sub> nte –

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

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

mn-mḡúKḡ ḡ ej tZ tm aitbi ḡ tevSvq hvḡ i gḡa th melq ev ḡḡKi Kviḡ t-tU ÷ cwi gvc Kiv nte tm melḡ cḡZ tRvovi gḡa ḡKQycwi givY mn-mḡúKḡ vḡK|

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

mgKḡ ḡ nj tmB ḡḡU ḡ hvḡ i tgḡj msLḡv mgvb nte| A<sub>ḡ</sub> ḡ ḡḡḡḡ tKvb melḡqi cixḡḡvq cḡB bḡḡi ḡḡḡḡZ mgKḡ ḡ MVb ntj GK ḡḡḡi cḡZḡK eḡḡi mgKḡ eḡḡ Ab ḡḡ vKḡZ nte|

Avgiv GB cḡḡḡ i agvḡ mn-mḡúKḡ ḡḡḡi Rb t-tU ÷ i cḡḡḡM tḡLe| cieZḡZ evḡK ḡḡḡ Avcbviv ḡḡḡRivB eḡḡḡi KiḡZ cviḡeb|

**mn-mḡúKḡ ḡ**

Avgivḡ i Kviḡḡ ḡḡḡḡi mviYxi gvaḡḡḡ ḡKQyMḡḡḡZK Z<sub>ḡ</sub> iḡḡḡḡ| G<sub>ḡ</sub>ḡḡḡ eḡḡḡḡi Kḡḡi Avgivḡ i ḡḡḡḡZ ḡKḡḡḡḡ ḡḡḡḡḡi cḡḡḡḡK cixḡḡḡḡ | Ppviš cixḡḡḡḡḡḡ cḡB bḡḡi i Mḡoi gḡa tKvb A<sub>ḡ</sub>ḡḡḡ cv<sub>ḡ</sub>ḡḡḡ Avḡḡḡ ḡKbv Zv Lḡḡḡ tḡLḡZ nte|

	cixḡḡḡḡ	
	cḡḡḡḡK	Ppviš
ḡKḡḡḡḡḡ msLḡḡ	20	20
Mo tḡḡḡ	M <sub>1</sub> = 36.30	M <sub>2</sub> = 40.60
Avḡḡḡḡḡḡḡ	s <sub>1</sub> = 4.50	s <sub>2</sub> = 2.30
mḡḡḡ- 1vḡ	r = 0.80	

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

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

c0tg  $SE_D$  *tei KitZ nte* –

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

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

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

*μwšgvb* *mvf\_ Zjv* *Kivi AvM* *raxZv gviv* *ev degrees of freedom* *tei KitZ nte* |

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

19 *raxZv gviv* 0.05 *ti t Gi μwšgvb* *nj* 2.093 |

*t* *Lv hv"Q,* *wtmtei dtj c0B gvb* 3.02, *μwšgvb* 2.093 *Gi tPtq eo* |  
*ZvB Avgiv m×všvbtZ cwi th,* *GB 20 Rb wkvv\_#* *DjwLZ wltqi c0wK I*  
*Povšicvqv* *c0B bvti* *Mtoi gta* *A\_en cv\_R* *itqtQ* |



### cvVvEi gj'iqb- 8

#### A) msuŋB DEi cŋæ

1. mn-m<sup>u</sup>Kŋy ᄡj i tŋtŋ: ŋmve Kivi mgq ᄡaxbZv gvŋv ŋKfŋte ŋBYŋ Kiŋeb?
2. mn-m<sup>u</sup>Kŋy ᄡj ej tZ ŋK eSvq?
3. ᄡu ᄡj i Mto t'ŋi i gta" A\_ŋn cv\_R" \_vKtj ŋK eStZ nte?

#### Av) MŋvŋZK mgm'v

ŋbtPi mvi Yxi Z\_ " AeJ <sup>+</sup>tb t Gi gvŋb ŋBYŋ Kiŋeb/

j 1	j 2
n <sub>1</sub> = 16	n <sub>2</sub> = 16
m <sub>1</sub> = 26	m <sub>2</sub> = 29
s <sub>1</sub> = 2.31	s <sub>2</sub> = 2.50
r = 64	

#### Av) MŋvŋZK mgvaŋb

cŋtg SE<sub>D</sub> tei KiŋZ nte

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

Ar`kŋmvi Yx ntZ  $\mu$ msŋgvb 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`Q, ινmveKZ.gvb 1.09 μvιś gvb 2.95 Gi tPτq tQvU|

mZivs, ejv Pτj th, `g `tj i cix¶vi bτii Mtoi gτa` th cv\_R` itqτQ Zv A\_@n  
bq|

**cW 9**

**F-tU÷**

**Dჭიკ**

GB cW tkქl Avcwb —

- ◆ F-tU÷ i cჭqvRbxqZv e`vL`v KiქZ cvi teb;
- ◆ wkყv MtelYvi tყქქ 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 bglyvi tყქქ hLb gvქ `BwU bglyv `j Mvb Kiv nq ZLb GB `BwUi Mქoi cv\_ქK`i gvქv wბიჯY Kivi KvქR t-tU÷ ev z-tU÷ e`envi Kiv nq/ bglyv `j `B Gi Awak nქj F-tU÷ e`envi Kქi gvქv wბიჯY Kiv mქe/

F-tU÷ i gva`tg gj-Z tF`v¼ wექ- IY Kiv mქe/ cქtgB Avgiv tRქb tbB F AbgvZ KvქK eქj |

GKB Z\_`mek; nქZ msMpxZ `BwU bglyv `ქj i tF`v¼ i AbgvZქK eქv nq F |

gtbKwi, tKiv GKwU Z\_`mek; hvi tF`v¼ nქPQ σ² nქZ bglyv msMθn Kქi `BwU `j Mvb Kiv nj hvt`i tF`v¼ S₁² Ges S₂² | hw` bglyv msMθn tKiv ႁawU bv `vქK Zქe Avgiv eქქZ cvi e th bglyv `BwU ci `úქi i Abქcყ

$$A_`ქ S_1^2 = \sigma^2 = S_2^2 \quad A_`ქ S_1^2 = S_2^2$$

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

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

tF`v¼ i gvb 0 (kb`) nქZ ∞ (Amixg) chქl nქZ cvi |

**ქaxbZv gvქv**

cქg bglyv `ქj tgქj msL`v (item number) N₁ Ges wZixq bglyv `ქj tgქj msL`v N₂ nქj ქaxbZv gvქv nქe:

$$(N_1 - 1) Ges (N_2 - 1) Gi AbgvZ |$$

A\_`ქ N₁ = 10 Ges N₂ = 10 nq Zქe F AbgvZi 9 ქaxbZv gvქvi GKwU j e tF`v¼ `vKქe Ges 9 ქaxbZv gvქvi GKwU ni tF`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\_ev 0.01 A\_@nZvi gvIv wntmte F Gi Av`k@v LjR` Bw gvZbi Zjbn KiZ nq|

**D`niY**

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

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

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

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

$$0.65 < 16.0$$

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



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

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

**ფიგKv**

Kიუუღვი გჯ- DcKiY abacas t\_ჷK DჷV Gჷm AvayბK Rxeb e`e`vჷK mჷuYჷჷc  
 ობqšY KiჷQ| Rxebi Ggb tKvb PriYჷჷĦ tbB thLჷtb Kიუუღვი e`eüZ nჷPQ bv|  
 Kიუუღვი thgb Rxebi DrKIჷv eჷx`i jჷჷĦ" ობqჷmRZ tZგობ MჷelK KZR.  
 cჷi Pჷnj Z MჷelYvi გჯ- j`Ħ" nj გიბე Rxebi ოეფბეტჷჷĦ Ae`ობK DrKIჷv eჷx`  
 Kiv| mჷZivs AZ`šl` ოფოეKჷჷბეB eZგობ hჷMi MჷelK Zოi MჷelYv KvტR Kიუუღვი  
 e`envi Kიჷბ|

GB BDიბჷUi KჷqKიU cჷჷV AvგიV MჷelYv KvტRi ოეფბეტ`ჷi Kიუუღვი ოK aiჷbi  
 Ae`vb ivLჷQ Zv Avჷj vPbv Kie|

cV - 1 MჷelYv KvტR Kიუუღვი i e`envi

cV - 2 MჷelYvq Kიუუღვი cჷi Kი ბv

cV - 3 Kიუუღვი I MჷelYv Z`"

**cW 1**

**MtelYv KvR KivúDUvii e`envi**

**Df`ik`**

GB cW tkfI Avcb —

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

KivúDUvi AvaybK Rxebhvîvi cûZuU tʻqT Ggbfivte c`PviYv KitQ th Dbz Ges Dbqbkj t`kmgR th hvi mva`gZ KivúDUvii e`envi ewx Kti Pj tQ| evsj v`k eZgvtb ukʻve`e`v, tUvj thvMvthvM, hubevnb Pj vPj, mi Kvi x kumbhš;meP AwaKviti KivúDUvii e`envi cPj b Kivi cPóv Pj tQ|

cûKwZK meAvfbi melqmgfni ZÉxq aviYv Qvov Ab`vb` me aifbi MtelYvi tʻqT AZ`síRiUj cûKwZi I `vgx hšcWZ e`eüZ nq| Gme hšcWZ µq Kiv, `vcb Kiv Ges MtelYv KvR Pviy tQ hvl qv GKvKx tKvb GKwU t`tki cʻq AmjævRbK etj B CERN mn Ab`vb` thš\_ MtelYvMvi Mto DVtQ AvRKvj | tmšfvM`ekZ ukʻv MtelYvq Lø D`P gʻt`i hšcWZ br ntj I Pj, ukʻv gtbmeAvb, fivv ukʻv; BZ`w` tʻqT Aek` cûqvRbxq hšcWZ ht\_ó`vgx| A\_`cûBi mæbebr qY ntj I th aifbi MtelYv Kiv mæe Zinj ukʻv mæúKZ melq| ukʻvtʻqT Aek` AfbKiv`b AvM t`tKB KivúDUvii e`envi iiaentqT|

ukʻvtʻqT KivúDUvii e`envi tʻqT mektfI wZbuU c\_ KfvM fivM Kti t`Lv DvPZ – cûvgK, gva`vgK I D`P ukʻv| Avqv`i t`tk mi Kvi x cûvgK ukʻv e`e`vq tkYxKtʻq KivúDUvi e`eüZ br ntj I cûvgK ukʻv Awa`Bi ev RivZxq ukʻvµg I cv`cÿK tevW`Zv`i bvbv KvR KivúDUvi e`envi Kti | gva`vgK `fi 00KivúDUvi ukʻv00 melquU Hiv`OK melq intmte beg tkYxi ukʻvµtg itqT| D`P ukʻv tʻqT MtelK, ukʻvK, cûvmK, bWZ ubaʻfK mevB KgtemK KivúDUvi e`envi Ktib|

Gevi Avmv hvK&MtelYv tʻqT KivúDUvii e`envi mæfU Avtj vPbvq|

Avgiv Rvb, KivúDUvii software AwZ `æZ MwZtZ meKwKZ nt`Q| A\_`GKvWigK tʻqT mg`ÍcW\_ex Rto hZ tgsij K MtelYv ag`cûkvbvi tei nq Zvi tPtq AfbK temk msL`v software tei nt`Q cûZ eQi | Richards etj tQb KivúDUvi tKvMs, mÅqKiY, MYbv BZ`w` KvR AwZ mnRB MtelKtK mrvh` KitZ cvi` | Avgiv t`Le GB KvR\_ tjv ukʻv fivte ntZ cvi` |

- **tKvMs ev mstKwZK cûµqv**

KivúDUvii mrvh` AwZ mnRB text mstKwZK cûµqvq msi qY Kiv mæe GiKg GKwU Avw` mclWl q`vii bvg “The Ethnograph”| eZgvtb Aek` `qsmµq ev automated tKvMs tKškj I Pj yntqT|



ḡ Ae GWKkb

• **mÂqKiY** (Storing information)

ḡQycPij Z mdḡI qḡḡi i mrvḡḡ RbMY, ḡvb BZḡḡ mḡÜxq Z\_“ msiḡḡY Kiv mḡḡ/ ḡKḡḡs cḡḡqvi mḡḡ\_ mḡúḡKḡ Kḡi Z\_“ mÂq Kij cieZḡZ GB Z\_“ eḡcKfivḡ eḡenri Kiv mḡḡ nq|

• **MYbv Kiv** (Counting)

“Text search programe” Gi mrvqZvq

- *civ AbyḡÜvb* (searching text): MḡelK ḡbRḡ^cḡḡqvRb AbyḡÜvb gj Z\_“ AbyḡÜvb KivR text retrievers eḡenri Kḡi ḡḡKb|
- *thvMḡḡḡ* (linking): gḡḡKbUK KḡḡúDUḡḡi i nḡBcvi KḡḡḡGi Dḡḡḡḡbi dtj MḡelK Hyper research, hyper soft, hyper quell aiḡbi cḡḡqvRbḡq mdḡI qḡḡi ḡKḡḡ ḡḡZ civḡib|
- ḡPḡ, ḡḡqvMḡḡ I ḡbUI qvKḡ: ATLASTI cḡḡ MḡelYv KivRi Rb” semantic networking eḡeḡḡ Pḡj yKḡi |

KḡḡúDUḡi KLḡḡḡB MḡelḡKi gj ḡPḡḡ kḡḡ<sup>3</sup> ev mRbḡkḡḡ<sup>3</sup>ḡK Qmḡḡḡ thḡZ civḡḡe bv| Zḡe hZ ḡḡḡ hḡḡḡQ ZZ evRḡḡi bZḡ mḡḡḡḡḡḡḡ mdḡI qḡḡḡi Aḡḡḡḡḡḡḡi dtj MḡelK AḡḡK nḡḡi KḡḡúDUḡiḡK Zḡi MḡelYv KivRi mḡḡ\_ mḡúḡ<sup>3</sup> KiḡZ civḡḡḡb|

ḡKḡḡḡ MḡelYv KivR KḡḡúDUḡḡḡi eḡenriḡK cḡḡK Kḡi ḡḡLḡ ḡḡó Kḡmḡḡ eḡvcri |



**civḡḡḡi gjḡḡḡb - 1**

• **msḡḡḡB Dḡḡi cḡḡḡ**

1. ḡKḡḡḡ MḡelYvi ḡḡḡḡḡ GKRb MḡelK ḡKfivḡe KḡḡúDUḡḡi i mrvqZv MḡḡY KiḡZ civḡib?
2. MḡelYv KivR KḡḡúDUḡḡḡi ḡKḡḡḡs, mÂqKiY I civ AbyḡÜvb KivRḡḡḡ eḡLḡḡ Kivḡ|

**cW 2**

**MteIYv cwi KÍ buq KÍúDUvi**

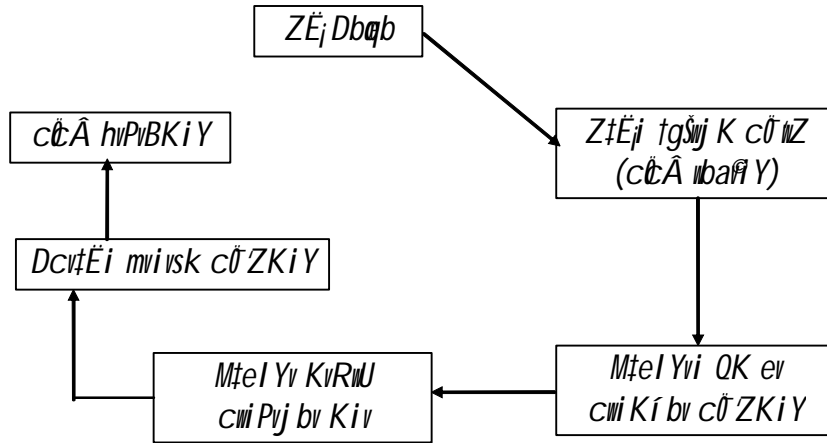
**Dfík`**

GB cW tkfI AvciB —

- ◆ MteIK wntmte KÍúDUvii e`envi wPwYz Kitz cvi teb Ges
- ◆ MteIYvi wefbae`li wbu`Ÿ Kitz cvi teb|

cŃq GKkZ eQfii AwfÁZv tcmiŃq AvR wKŃv MteIK wKŃv MteIYvK `eÁwmbK MteIYvi mgchŃqi ghŃvq Dbz Kitz mŃg nŃqtQb| hw`l`iiaŃZ Ae`v GiKg wQj bv|

GB cvfVi`iiaŃZB Avgiv GKwU`eÁwmbK MteIYvi QK t`tL tbB|



**wPŃ 6-2.1: `eÁwmbK MteIYvi QK**

GB QfKi tgŃvU QqŃw`fii cŃZwUŃZB eZŃvtb KÍúDUvi e`envi Kiv mæe etj cŃZxqgvb nŃqtQ| Avgiv GB cvfV cŃZwU`li weŃPbv Kie|

Avgiv GB tKvŃmŃ wefbaeBDwbtUi gva`tg tRŃbuQ, tKvb wbu`Ÿ welfŃq wbu`Ÿ mgq ev cwi Ńek AbŃvqx tKvb NvUwZ, mgm`v t`Lv t`q Ges GB mgm`v mgvavŃbi Rb` wKŃv MteIK (ev Ab` th tKvb MteIK) e`enwvi K (ev applied) MteIYv Kivi wmxvŃŃ MŃY KŃib| Gici wZwb mgm`vi MfxiZv AbŃvqx MteIYv cŃÁ cŃZ KŃib|

MteIYvi cŃqvRbxqZv, mgm`vi MfxiZv, cŃB mgq Ges cŃŃÁi Dci wŃŃÉ KŃi MteIK cwi KÍ bv cŃŃq KŃib| eZŃv mgŃq KÍúDUvii tgŃij K Ask (hardware) Ges tŃŃŃŃŃ (software) wŃŃq cŃw\_xi Dbz Ges AMŃŃŃŃ t`kmgŃŃ GZ teik msL`K KÍR nŃ`Q th wefbae software Gi gŃa` cŃqvRbxq tŃŃŃŃŃŃ gva`tg th tKvb MteIK Zvi MteIYvi wefbae`fii KÍúDUvii e`envi mæú,Ń Kitz cvfIb|



**cW 3**

**KivúDuví I MtelYv Z\_**

**Dfík**

GB cW tkfI AvciB —

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

ukqYv e`e`v th tKvb t`tki c`qRb| Av\_`mvgvRK Ae`v Ges ivóq Pwin`vi Dci  
 ubfP Kfi Mto I fV| Avevi ukqYv e`e`vi wefbbw`tki Dbqbkfi ukqYv MtelYv Kiv  
 nq| thfnZzKivúDuvíi mrvth` MtelYv KvR cwi Kíbv I cwi Pijbv Kivi mvt\_`  
 KivúDuví µq Kiv, `vcb Kiv, MtelKfi ubR`^c`kqY, c`qRbq software mSMh  
 Kiv, AvSR`ZK chiq MtelKfi mvt\_` thvMvthvM i qYv Kiv me mgqB A\_`I  
 tUij thvMvthvM I we`jZi e`envi itqfQ ZvB KivúDuvíi mrvth` I KivúDuvíi Øviv  
 MtelYv Kiv Avgt`i t`tk GLtbr RbucqZv jvf Kfi bvB| m`zivs eZ`yb cvVU  
 Dcj wä KitZ ntj Avgt`i ewnt D`vniY chiqj vPbv KitZ nte|

BvUvibU, on-line e`e`v, I tqemvBU BZ`w` m`eav, tjv i agvI KivúDuvíi gva`tg  
 cvl qv m`e|

DcvE` msl`vi AvKfi ntj mviYx Kfi ivL`Z nq| GKB ai`bi Z\_` wefbbw`MtelYvq  
 tcfZ ntj tc`M`gs-Gi gva`tg ubR`^tc`M`g `Zwi Kfi tbl qv m`e| ukqYv gtbwe`Avb  
 AvSR`ZK chiq AZ`sl AMhni etj GB t`qfI MtelK DcvE` mSMh Kfi c`Pij Z  
 tc`M`gi e`envi Øviv AZ`sl mntR wek- IY `Zwi KitZ cvi`eb| AZ`sl mviY  
 chiqi Z\_` mSMh Kivi c`xwZ nj mviYex Kfi diskette Gi store Kfi ivLv|

mSMpxZ Zf`i gva`tg M`ndKij wPÍ tcfZ ntj KivúDuví M`ndK`n Astk th`Z nte;  
 wfvWI M`ndK`n tKSkj e`envi Kfi `U wPÍ, cvB wPÍ BZ`w` c`fZ Kiv m`e| wv`U  
 e`ZxZ AcwUK`ij wv` (optical disk), CD-ROM, DVD-ROM BZ`w` i mrvth` I  
 Z\_` msi qY Kiv nq| G m`fU we`vwi Z Z\_` ØvikqYv thvMvthvM I c`hny`Ø tKvm`  
 eBwUfZ cvl qv hvte|

PLEXYN iktivbtgi GKw KivúDuví ubfP tKvWvs c`xwZ AvfQ hvi mrvqZvq  
 chiqe`qY c`xwZ ubfP MtelYv Kiv m`e|

chiqe`qY c`xwZ ubfP MtelYvi Z\_` KivúDuví msi qY Kiv m`e| wefbbw`ukqYv  
 MtelK GB ai`bi KvR KivR-Kjg c`xwZi weKí wntmte KivúDuvíi uk-`tevW`Gi  
 mrvqZvq Z\_` tiKW`Kivi mvt\_` mvt\_` msi qY Kfi ubfPQb| AwWI Ges wfvWI e`e`vi  
 gva`tg th mg`I MtelYv KvRi Askwetkl tiKvW` Kiv nq tm, tjvi msi qY KvRi  
 KivúDuví e`envi Kiv m`e|

ᄡ Ae GwKkb

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

KwúDUvti i gva"tg th mg"l mclwI qvti i mnvqZvq Z\_ a"i ivLv nq Zvi KtqKw  
D`vniY wbgjfc:

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

G mg"l Z\_ c"i wfvbæmgq wfvbæclwqv wtkdY Kti wkvvtvvtI e"envi Kiv  
nq|



### cvVvÉi gj"vqb - 3

- msvvB DEi clæ

1. MtelYv Z\_ msMh I msiY Kivi KtR wKfvte KwúDUvi e"envi Kiv mæ?
2. KwúDUvti i mnvqZvq MtelYv Z\_ msMh I msiY Kiv nq GiKg KtqKw  
mclwI qvti i bvg wj Lj|





### vbNE

**A**  
AcivgwiK cwi msL`vb 71

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

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

**D**  
DEi  
tLvj v 33  
ubw` 0 33

**Q**  
QK (eÁmbK Mtel Yv) 90

**d**  
F-test 85

**K**  
KvBelM<sup>9</sup>U÷ 73  
tKvMvs cLqy 88

**U**  
t-test 80

**f**  
tf`v¼ σ 85

**M**  
Mtel Yv m` f<sup>53</sup>  
MvE 39  
Mtel Yv  
KvthCthvMx 17  
Rvi c 12  
wel qx Aby`vb 14

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

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

**m**  
mstk- I 56  
mstk- I v¼ 61  
`faxbZigvI v 85  
mv<sup>9</sup>lvKvi  
tKŠkj 29